Vol. XXX FEBRUARY 1936 Number 2

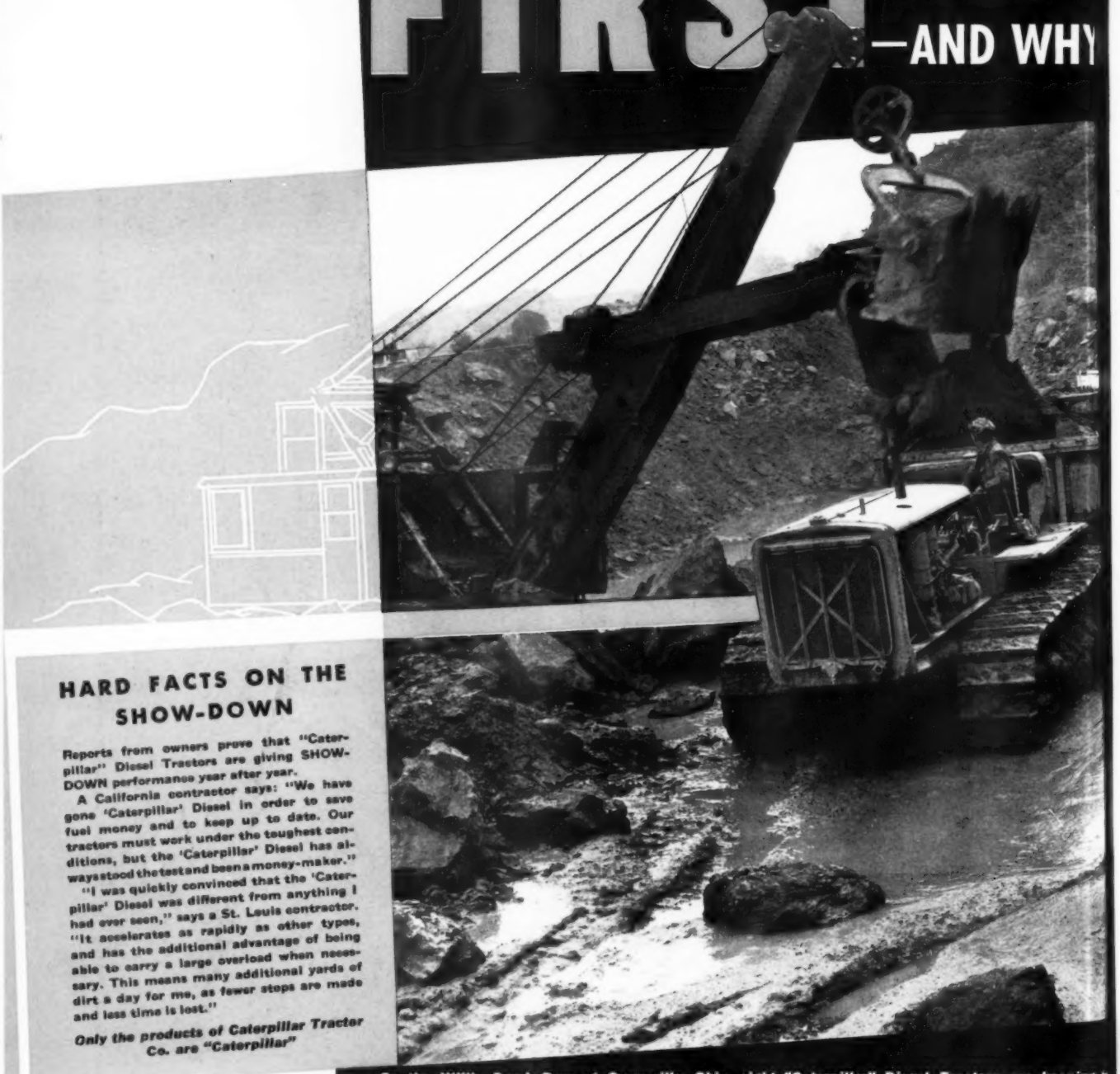
EXCAVATING ENGINEER

FOUNDED 1905

EARTHMOVING LIBRARY

Here is a recent picture of the giant 30-yard stripper used by Binkley Mining Company at their Bob-O-Link Mine, one of the largest open pit coal mines in the world. Excavating Engineer will publish a feature article on this outstanding modern mine near Terre Haute, Indiana, as soon as complete performance data are available on the up-to-date equipment being used.

FIRST—AND WHY



HARD FACTS ON THE SHOW-DOWN

Reports from owners prove that "Caterpillar" Diesel Tractors are giving SHOW-DOWN performance year after year.

A California contractor says: "We have gone 'Caterpillar' Diesel in order to save fuel money and to keep up to date. Our tractors must work under the toughest conditions, but the 'Caterpillar' Diesel has always stood the test and been a money-maker."

"I was quickly convinced that the 'Caterpillar' Diesel was different from anything I had ever seen," says a St. Louis contractor. "It accelerates as rapidly as other types, and has the additional advantage of being able to carry a large overload when necessary. This means many additional yards of dirt a day for me, as fewer stops are made and less time is lost."

Only the products of Caterpillar Tractor Co. are "Caterpillar"

On the Willis Creek Dam at Conesville, Ohio, eight "Caterpillar" Diesel Tractors are keeping to schedule through the most difficult operating conditions.

In only four years, "Caterpillar" Diesel Tractors have become first choice for all kinds of projects. They star on the country's biggest jobs. They make possible lower bids, faster schedules, more profitable contracts. They head the list for economy in operating and up-keep costs, rugged dependability, and dollar-for-dollar investment. Over 10,000 owners have tested "Caterpillar" Diesel performance—and know it is the SHOW-DOWN. Get the facts from your dealer. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR DIESEL

REG. U. S. PAT. OFF.

Speed

Foley Bros., Inc., get high-speed drilling with this 29-T at their Rib Mountain Quarry at Wausau, Wisconsin.

BUCYRUS ARMSTRONG

DRILLING SPEED depends not only on the force of the blow at the bottom of the hole, but also on the *type of blow.* Bucyrus-Armstrong 29-T blast-hole drills have a high-speed rate of 56 to 58 strokes per minute and a maximum tool travel of 40 inches; add to this the snap-and-getaway characteristic that comes with rubber shock absorbers and the result is unequalled speed of penetration, greater production, and more tonnage per drill! Send for complete information on Bucyrus-Armstrong blast-hole drills...there is a size to fit your work.

BUCYRUS-ERIE

EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

Cletrac "80" equipped with Timken Bearings hauling Timken-equipped LeTourneau Buggy at Coyote Dam.

In modern construction equipment of every kind and type you will find Timken Bearings eliminating friction; carrying radial, thrust and combined loads; and holding moving parts in correct and constant alignment.

This triple ability assures high operating speeds, dependable service and long machine life. The more Timken Bearings there are in the equipment you buy the better it will perform and the less it will cost for operation and maintenance.

There is no substitute for Timken tapered construction, Timken positively aligned rolls, Timken Alloy Steel and Timken Mirror Finish in power shovels, hoists, excavators, concrete mixers, pavers, pumps, compressors or any other kind of construction machinery. Specify Timken-equipped.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN TAPERED ROLLER BEARINGS

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EXCAVATING ENGINEER

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DEVOTED EXCLUSIVELY
TO EXCAVATION

About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

Vol. 30 **FEBRUARY, 1936** **No. 2**

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45 Tons at a Bite! ..... **Front Cover**

The huge electric stripping shovel shown on our cover is one of the modern units of equipment recently installed by the Binkley Mining Company of Indiana at their new Bob-O-Link Mine near Terre Haute, Indiana. It carries a 30-yard dipper on a 105-foot boom and 64-foot handle. Coal loading to 33-yard Austin-Western Trail Cars hauled by White Motor Truck power units of most modern design is handled by a heavy-duty Bucyrus-Erie electric shovel equipped with a 5-yard dipper especially designed for loading from a coal seam.

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Looking Ahead

These interesting articles will appear in early issues of Excavating Engineer. Watch for them!

Building Fort Peck Dam

Dredging operations for the earth fill core, diversion tunnel construction, and the excavation for the spillway will be presented in a series of articles starting in an early issue.

Cleaning Ditches Along the Sacramento River

Paris Brothers, Rio Vista, California, use lightweight Bucyrus-Erie ⅜-yard dragline to advantage on ditch work through soft ground.

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Managing Editor

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Editor

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Assistant Editor

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KOEHRING HEAVY DUTY

MONO-PLATE box type welded body construction . . . inherent strength for rigidity and elimination of distortion and weave on uneven grade . . . light weight for maximum pay-load ratio . . . free swinging doors, instantaneously opened, at all speeds . . . "automatic hand" closes doors immediately, at operator's will, when pulling away from the load . . . high arched rear axle for maximum dumping clearance.

APPROXIMATELY twenty miles per hour for fast road travel . . . short turning radius at the dump and loading point . . . "non-raring" hitch ahead and below the drive axle for maximum pull . . . ample power and lug type tractor tires give positive traction for quick and nimble movement . . . low, wide body for fast and convenient loading . . . seconds saved every trip . . . more profit per job.

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TAKE A GOOD LOOK AT WHAT YOU DON'T SEE!

"FRICTION FLAMES"—generally burn unseen! But the way they damage expensive machinery, plant efficiency, economical operation, is always measured in dollars lost. When the Socony-Vacuum Representative calls at your plant, let him help you detect the places where friction is burning up your money. Remember . . . he brings you 70 years of experience—an exclusive asset backing up quality products of unvarying uniformity. Your men will find Socony-Vacuum's cooperation helpful in their daily work.

A Valuable Idea For You On The Next Page

RRECT LUBRICATION WILL SNUFF OUT THE LOSSES THAT BURN UP PROFITS

TAKE IT AWAY!

Shovels and drag-lines "snap into it"—no matter how tough the going—when SOCONY-VACUUM LUBRICANTS *are on the Job!*

WANT TO MAKE SURE your heavy-duty equipment will "dish it out" fast? Decide now to standardize on Socony-Vacuum Lubricants. For, compared with other oils—in unusually severe operations—they maintain maximum lubricating efficiency longer—give better protection to your expensive equipment.

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SOCONY-VACUUM OIL CO.
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GROUND GRIP TIRES *Cut Operating Costs* ON THE TOUGHEST JOBS

The Greatest! TRACTION TIRE EVER BUILT!

● PATENTED construction features built into Ground Grip tires make them the only logical choice for heavy duty on construction and earth-moving jobs. These strong, massive tires make their own road in any kind of going—yet won't bump when driven over paved roads.

The Firestone patented Gum-Dipping process makes Firestone Ground Grip tires tougher and more flexible—every strand of every cotton cord is soaked and coated with pure, liquid rubber. Two extra layers of these Gum-Dipped High Stretch cords lock the patented super-traction tread to the Gum-Dipped cord body of the tire, giving it greater strength to resist the stresses and strains of heavy pulling at low air pressures.

Put Ground Grip tires on all your equipment for greatest traction—long dependable service, fewer delays, lower operating costs. Your nearby Firestone Auto Supply and Service Store or Firestone Tire Dealer is ready to serve you.

Listen to the Voice of Firestone featuring Richard Crooks or Nelson Eddy—with Margaret Speaks, Monday evenings over Nationwide N. B. C.—WEAF Network

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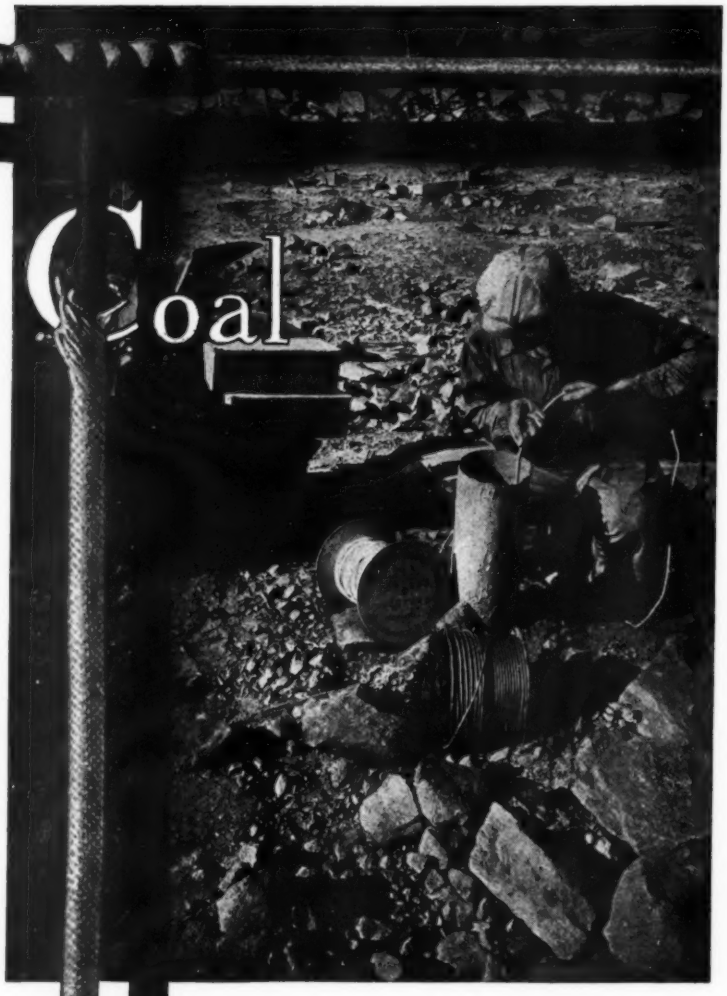
Stripping Coal *with* CORDEAU BICKFORD *at the* Lehigh Navigation Coal Company



In the strip pit one mile long and 1,500 feet wide, an average of 10,000 cu. yds. of rock overburden is blasted and removed every twenty-four hours. The Mammoth anthracite vein, pitched at 45°, is from 40 to 125 feet thick and yields an average of 3,000 tons of coal during this period.

Here is a production cycle that allows little time for fancy juggling with steam shovels, or mud capping to obtain proper fragmentation. The overburden is an "overhead" that must be removed as quickly and easily as possible.

Cordeau-Bickford Detonating Fuse is used throughout these stripping operations because *it pays in five ways:* (1) *Simplified Loading*—no caps in the holes. (2) *Less Hazard*—Cordeau is insensitive to ordinary shocks. It must be detonated in order to detonate the loads. (3) *More Work from Explosives*—each cartridge, being detonated directly by the Cordeau, has the added force of a *primer* cartridge. (4) *Fewer but Bigger Shots*—Cordeau not only detonates each hole but connects all holes, producing the Giant Blast. Equipment moved less often. (5) *Better Fragmentation*—planned rotation secured with a Cordeau hook-up permits relief of burden, and allows each charge to exert its force to the best advantage.

Cordeau-Bickford Detonating Fuse is manufactured with the same precision that has made Ensign-Bickford Safety Fuse famous since 1836. Let us send you a copy of our Centennial Book—and tell you more about Cordeau.

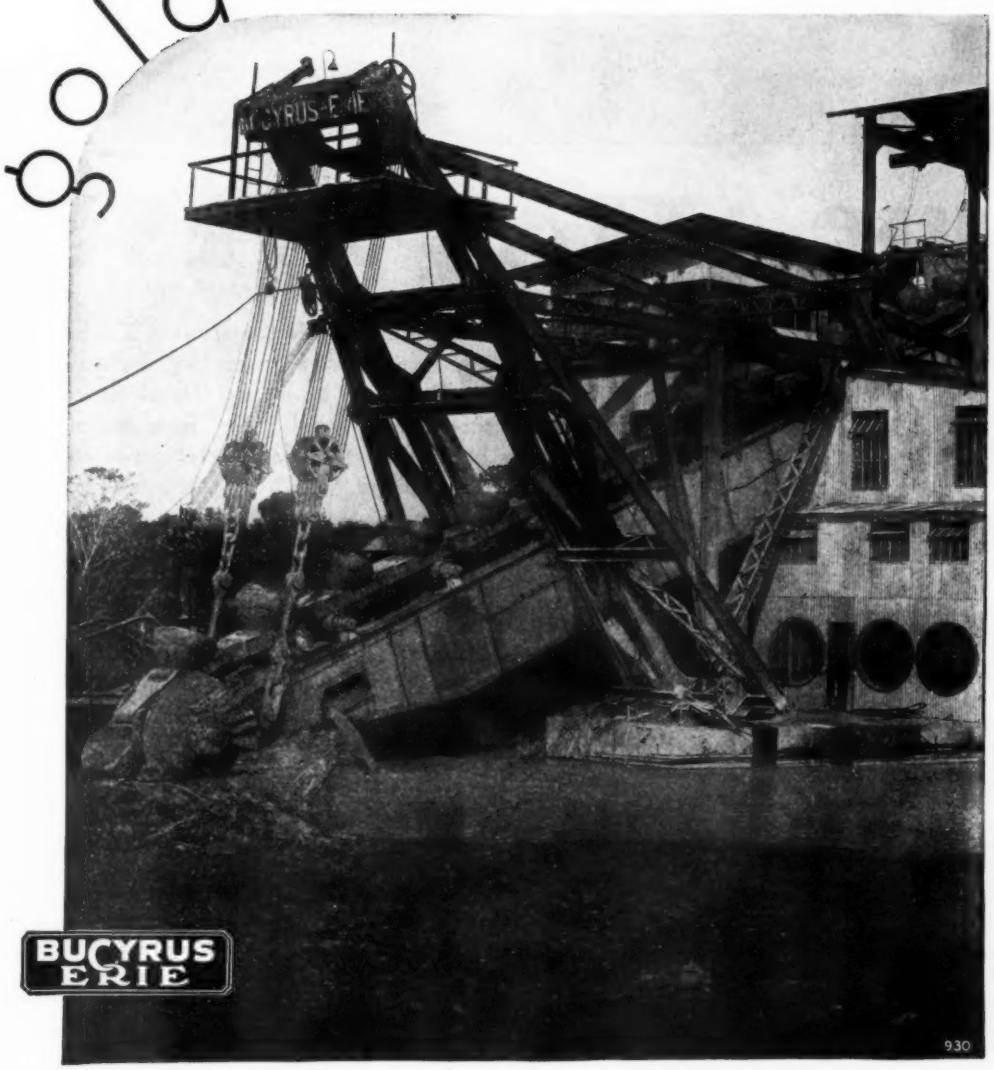
CR50

The ENSIGN-BICKFORD COMPANY Simsbury, Conn.

SAFETY FUSE *Since 1836* • CORDEAU-BICKFORD DETONATING FUSE

For your convenience in writing to The Ensign-Bickford Company, you will find a card bound in this issue.

WHEN you're after placer gold, you gamble big stakes on the ability of your dredge to recover the full values in your property and to give you consistently high output. Your best insurance of modern quality and quantity in dredge performance is to buy from the world's oldest and largest manufacturer of excavating equipment. You get maximum experience, unified responsibility, capacity to fit your requirements, highest quality of specialized materials and workmanship, up-to-the-minute engineering.



BUCYRUS-ERIE

EXCAVATING, DRILLING, AND MATERIAL-HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN

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MODERN GOLD MINERS

What the "Forty-Niners" used to do with pick, shovel and gold pan, is now being done with Atlas Diesels, more thoroughly, more economically, and much faster than it was done by the old sour doughs.

use ATLAS DIESELS!

Out in the Mother Lode Country in California, Ferris and Cumle are working a marginal property by the new method of drag line dredging. They use an Atlas Diesel powered Bucyrus-Erie drag line to scoop up alluvial gravel from the stream bed and dump it into the hopper of an Atlas Diesel powered revolving screen built on a floating barge.

A third Diesel supplies the water for the pond in which the floating barge operates. The water is used to wash the gold from the gravel and mud dumped into the revolving screen, 600 gallons of water being required to wash a cubic yard of gravel.

With gold at $35 an ounce, miners can profitably operate many a marginal property with Diesel engines that could not be worked with gasoline engines or purchased electric power. Diesel economy spells the difference between profit and loss and if there is but a narrow margin to work on, economical power is paramount.

No matter whether you are working a placer, a dredge or a deep hole, there will be more profit at the end of the month if you do the job with Atlas Diesels. They are slow speed, heavy duty engines built for continuous service and they are available in a complete range of sizes. Complete details on any size unit are furnished on request.

ATLAS IMPERIAL DIESEL ENGINE CO.

OAKLAND, CALIFORNIA MATTOON, ILLINOIS

ATLAS IMPERIAL

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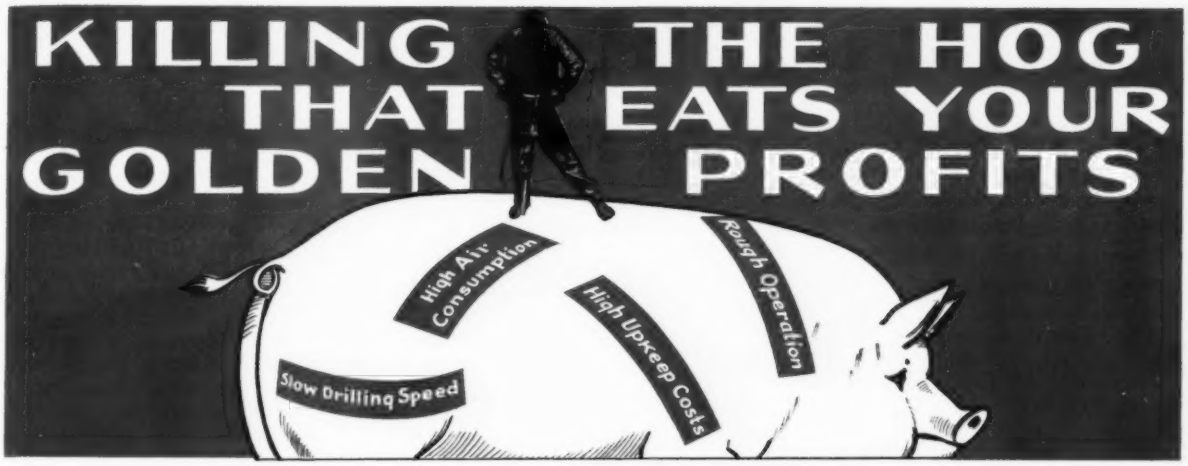

Make your drilling jobs PAY!

Poor equipment is *often* the greedy hog that eats up your profits. Starve him to death! Use Sullivan drills and accessories

Distinctive SULLIVAN Features

DRILLS For Every Job

L-1 30 lb. Rock Drill; L-2 45 lb. Rock Drill; L-9 55 lb. Rock Drill.

*Lively action—Superior drilling speed.

*Low air consumption—higher efficiency on portable compressors.

*Easy to operate—runners like them.

*Materials—Accurately machined and ground.

*Durability—Finest materials and workmanship.

WAGON MOUNTINGS

*Mobility.

*Increased footage—drifter production with hand-held drill mobility.

*Versatility—Holes, any angle; snake holes, toe holes, down holes, holes close to the floor or close to the face.

Shown in circle—Sullivan L-2, 45 lb. Rock Drill.

Distinctive SULLIVAN Features

TOWER MOUNTINGS

*Makes deep hole drilling profitable.

DETACHABLE BITS

Departure from conventional design. Result:

*40-60% more hole.

*Reduction in drill steel investment.

*Lower cost per foot drilled.

SULLIVAN ALSO MAKES:

Air Compressors, Rock Loaders, Room Hoists, Car Puller Hoists, Shaft Hoists, Slope Hoists, Coal Cutters, Coal Drills, Coal Saws, Core Drills, Scrapers and Scraper Rope.

Large illustration shows Sullivan Tower Mounting.

SULLIVAN MACHINERY COMPANY

307 NORTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

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Not in the Contract

A Buyer: "That land you sold me is no good. You said I could grow nuts on it."

A Seller: "Oh no, I didn't say that. I said you could **go** nuts on it."

"Did that sailor attempt to kiss you last night?"

"Why, mother, you don't think he came all the way from the battleship just to listen to our radio, do you?"

History Prof: "Who was Talleyrand?"

Student: "A fan dancer, and cut out the baby talk."

First Contractor's Boy: "My father was a great man; he dug the Mississippi River; threw the dirt out, and made the Rocky Mountains."

Second Contractor's Boy: "That's nothing; you know the Dead Sea—well, my father killed it."

"How's your wife getting along with her driving?"

"She took a turn for the worse last week."

Claims Agent: "Here's another farmer who is suing us on account of his cows."

Officials: "One of our trains has killed them, I suppose?"

Agent: "No, he claims our trains go so slow that the passengers lean out the windows and milk his cows as they go by."

Wife: "Will you love me when my hair has turned to silver?"

Hubby: "Why not? Haven't I stuck with you through brown, red, and black?"

"I'm losing my punch," she said, as she left the cocktail party in a hurry.

'Twas the night before payday,
and all through my jeans
I'd hunt in vain for the ways
and means;
Not a quarter was stirring, not
even a jit;
The kale was off duty, the green-
backs had quit;
Forward, turn forward, O Time,
in thy flight,
And make it tomorrow, just for
tonight.

S. BUTCHER

A man who was moving from his home to a new residence located about half a block down the street elected to carry a lot of the household goods himself, and thus cut down the moving bill. He started out early one morning to carry a very heavy antique grandfather's clock. Struggling out to the sidewalk, he set the clock down, rested a bit, and resumed his journey, stopping at frequent intervals to rest and mop his brow. The performance was observed with great interest by a neighbor just getting home from a night spent in revelry and what-not. Presently the reveler approached and said, "Pardon me, neighbor, but I'd like to give you some advice that will save you a lot of trouble. Why the hell don't you get yourself a watch?"

Extricating himself from beneath an overturned car, the victim heard his radio blare out: "I'll be glad when you're dead, you rascal you!"

A little darky was fishing in the river and hooked a nine-foot sturgeon which pulled him out of the boat. He turned loose the line, climbed back into the skiff, got down on his knees and offered the following prayer:

"Good Lord, there's one thing this poor little nigger would love to know, and that is, is this here nigger fishing, or is that there fish niggering?"

A shovel runner, very much married, spent a riotous evening with some of "the boys," and felt —and looked—very seedy "the morning after."

His wife was anxious about him and persuaded him to consult a doctor. The latter, after examining his patient, diagnosed his complaint and prescribed for him.

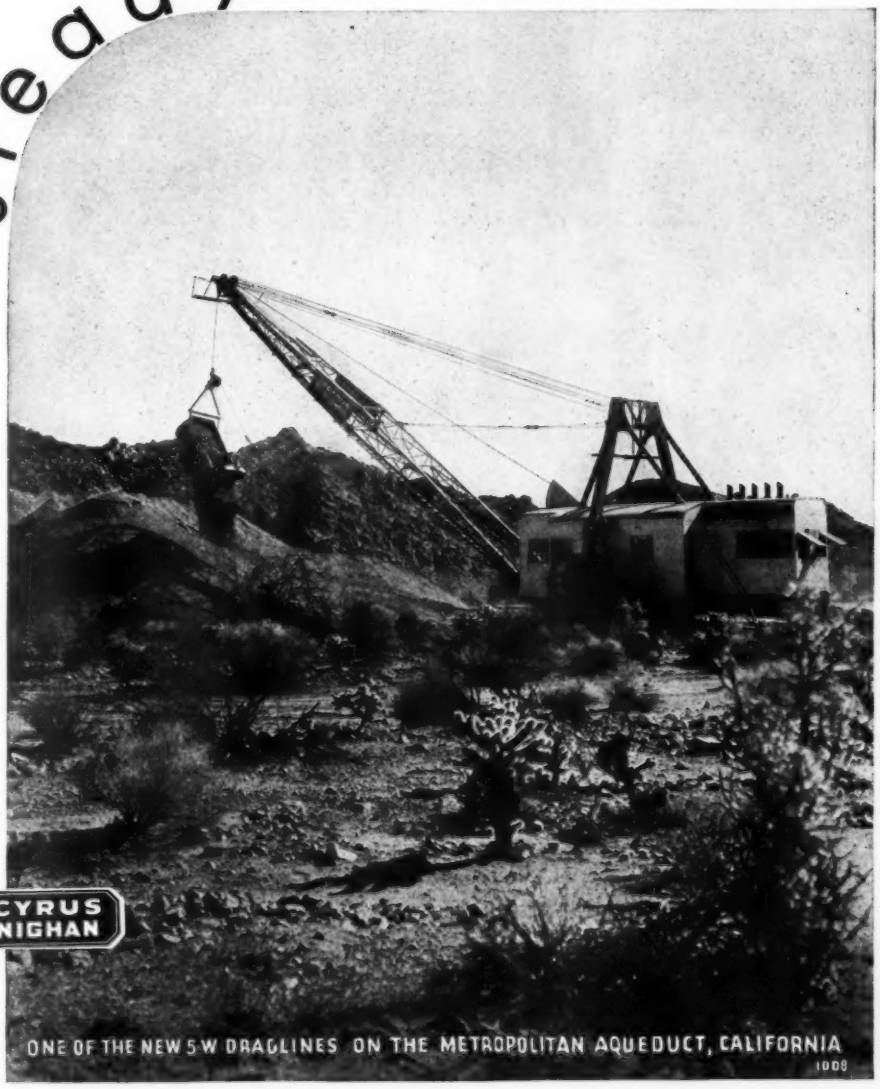
"The wife will want to know that I am suffering from," said the patient as the doctor showed him out.

"Oh, tell her it's syncopation," was the reply.

On his return home hubby repeated to her what the doctor had said. She did not know what the word meant, so she looked it up in a dictionary and read: "Syncopation—an uneven movement from bar to bar."

LOAD, swing, dump . . . load, swing, dump . . . as steadily as clockwork, the Bucyrus-Monighan Walking Dragline steadily and relentlessly "bears down" on the job at hand . . . regardless of ground obstacles, weather or footing conditions. The Walker gives you high yardage because of its power, speed and endurance . . . plus astonishing walking-traction mobility, that saves time and means higher output per day and greater profits per job. Why not cash in on the Walker on your next dragline job? Manufactured by Bucyrus-Monighan Company, Chicago, Illinois.

steady



ONE OF THE NEW 5-W DRAGLINES ON THE METROPOLITAN AQUEDUCT, CALIFORNIA
1008

Sold by

BUCYRUS-ERIE

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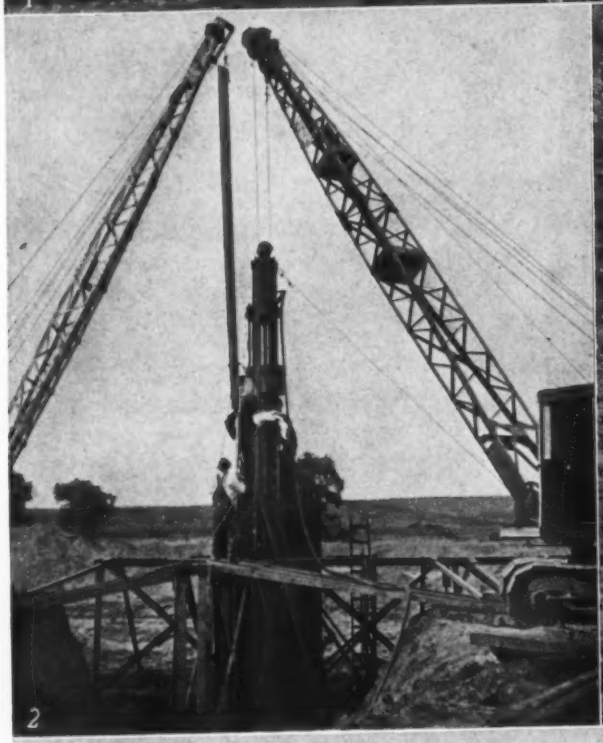

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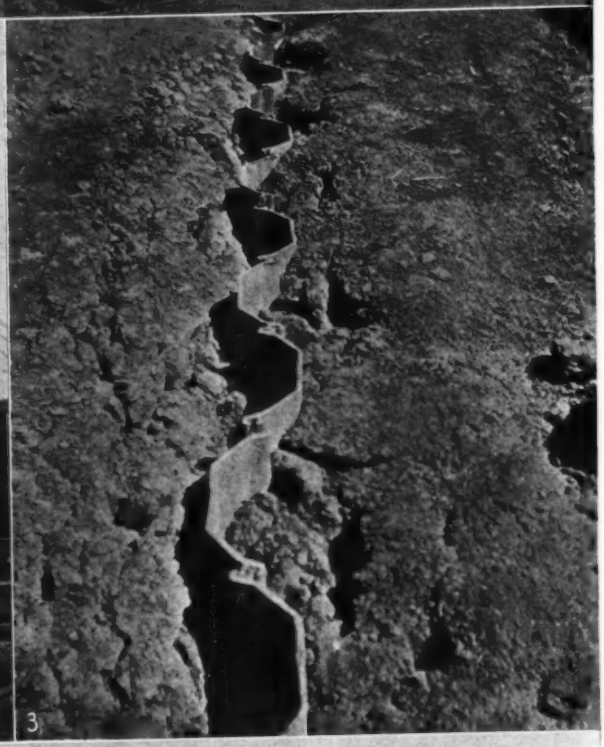

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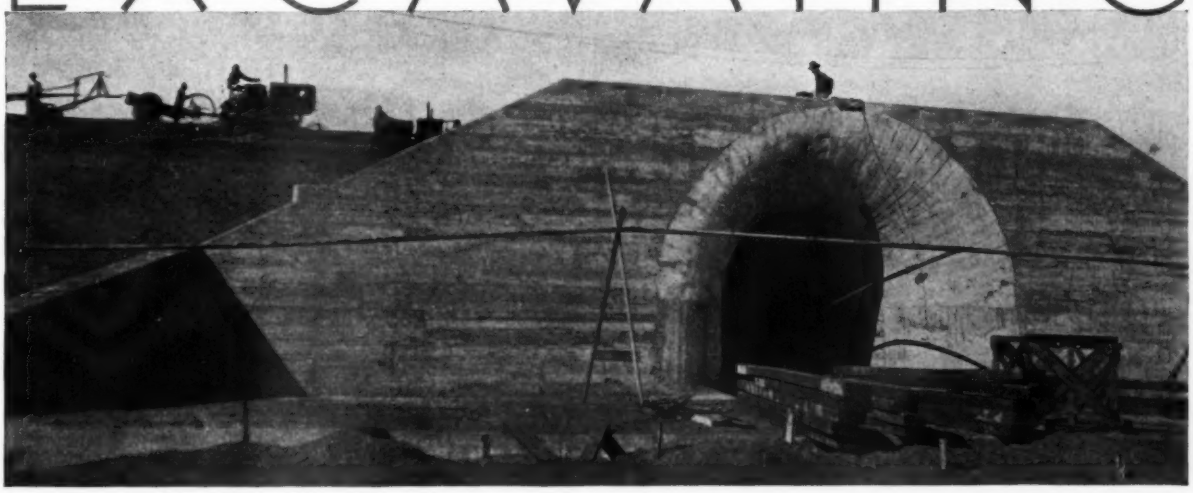
EXCAVATING ENGINEER
FEBRUARY 1936 VOLUME XXX NO. 2



● *Concrete work on the upstream end of the discharge conduit for Cherry Creek Dam is completed. On the embankment may be seen the grading and compacting equipment in operation.*

Protecting Denver from Flash Floods

Frontispiece

● *1. The excavation for the stilling pool, 170 feet long by 110 feet wide and 25 feet deep, was handled by this Bucyrus-Erie 37-B dragline and a ½-yard General. Two 8-inch submerged pumps were necessary here to dispose of the water flowing in Cherry Creek. 2. Special "X"-shaped steel piles were used at the middle of the dam where the center lines of the discharge conduit and dam intersected. The Bucyrus-Erie holds the Vulcan steam hammer on the piles hoisted into position by the General crane working on the other side of the cut-off trench. 3. Looking down the center line of the dam showing the 20-foot steel piling cut-off wall driven through the compacted clay fill. 4. An 8-yard Euclid Trac-Truk with its load of clay climbs the embankment incline to the top of the fill.*

Draglines and elevating graders are used to good advantage by M. E. Carlson Construction Company of Denver, in building 1,000,000-yard earth-fill dam as part of flood control project

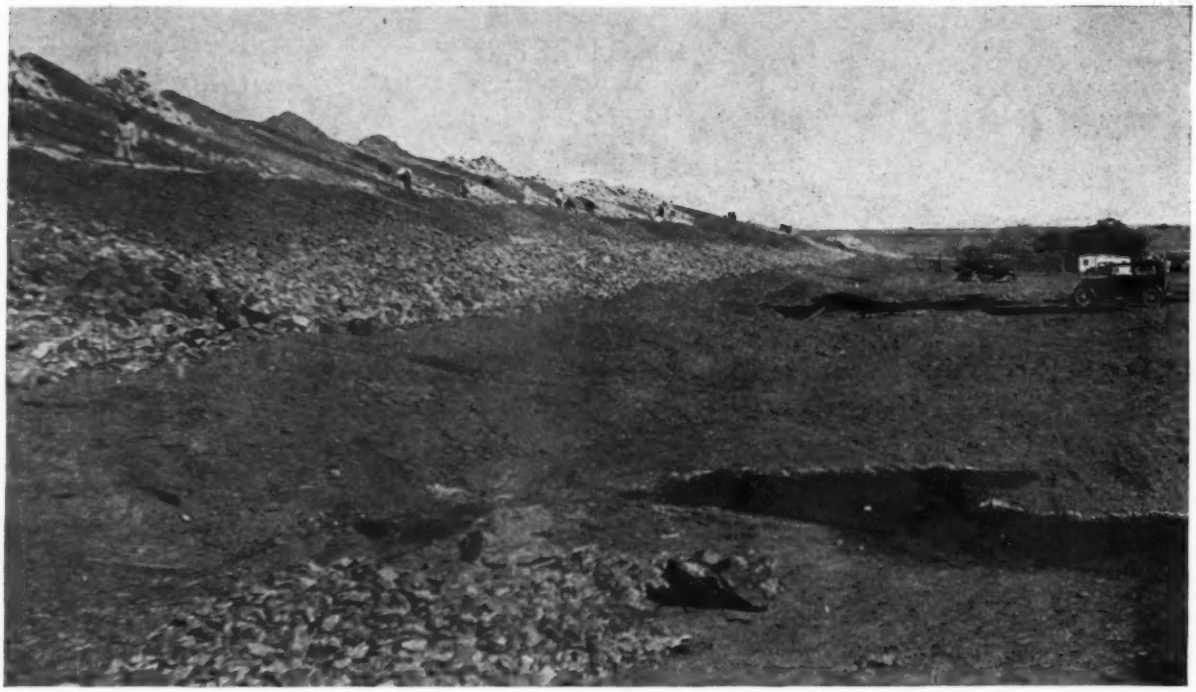
By C. W. Campbell

THE CITY of Denver has, for many years, suffered from floods originating in the Cherry Creek basin which lies southeast of the town. Normally, the stream flow is small, but occasionally large volumes of water are carried into the city as the result of severe local cloud bursts falling into the relatively large drainage basin of the creek.

Approximately a year ago the city officials in Denver created the Cherry Creek Flood Control Improvement District which was empowered to take the necessary steps to protect the city from damage. Receiving financial aid from the PWA, plans for the dam and other necessary improvements were drawn up and bids taken. The successful contractor on the dam, an earth-fill structure, was M. E. Carlson, a well known Denver contractor on his bid of $461,000.

Actual construction was started late in July, 1935, and by August 1st, the contractor had the work completely equipped and well under way.

The main feature of the Flood Control Program, known as PWA Project No. 5489, is an earth-fill dam, approximately one mile long, which will permit regulation and control of the water in Cherry Creek by means of a dis-



charge conduit, through the center of the dam, of sufficient size to handle the volume of water which normally flows through that portion of the stream lying in the city. The conduit will have a discharge capacity of 8,750 second feet. The dam will be 45 feet high in the center.

A shallow spillway, concrete lined and 300 feet wide, located at the south end of the dam, will carry off flood waters of extreme proportions and prevent the dam from being overtopped.

Steel Piling for Cut-off Wall Driven by Gasoline-Powered Crane

The first operation in the construction of the dam was the clearing of an area, 300 feet wide by approximately a mile long, of trees, brush, and other vegetation. The loose dirt, loam, and sand was loaded by Caterpillar elevating graders to dump trucks and hauled away from the dam site. This operation involved cuts of only shallow depth and was done to get rid of the loose material.

M. E. Carlson then excavated the cut-off trench, five feet deep by approximately 15 feet wide, along the center line of the dam for its entire length. This excavation, involving approximately 43,600 yards, was handled by a gasoline - powered Bucyrus - Erie 37-B dragline, carrying a 2-yard bucket on a 50-foot boom. The machine loaded to Euclid Trac-Truks which dumped the spoil outside of the construction area.

The trench was then back-filled with clay which was thoroughly sprinkled and packed into place. The packing operation was done

● *A general view of the earth-fill Cherry Creek Dam showing workmen placing rip rap on the upstream face.*

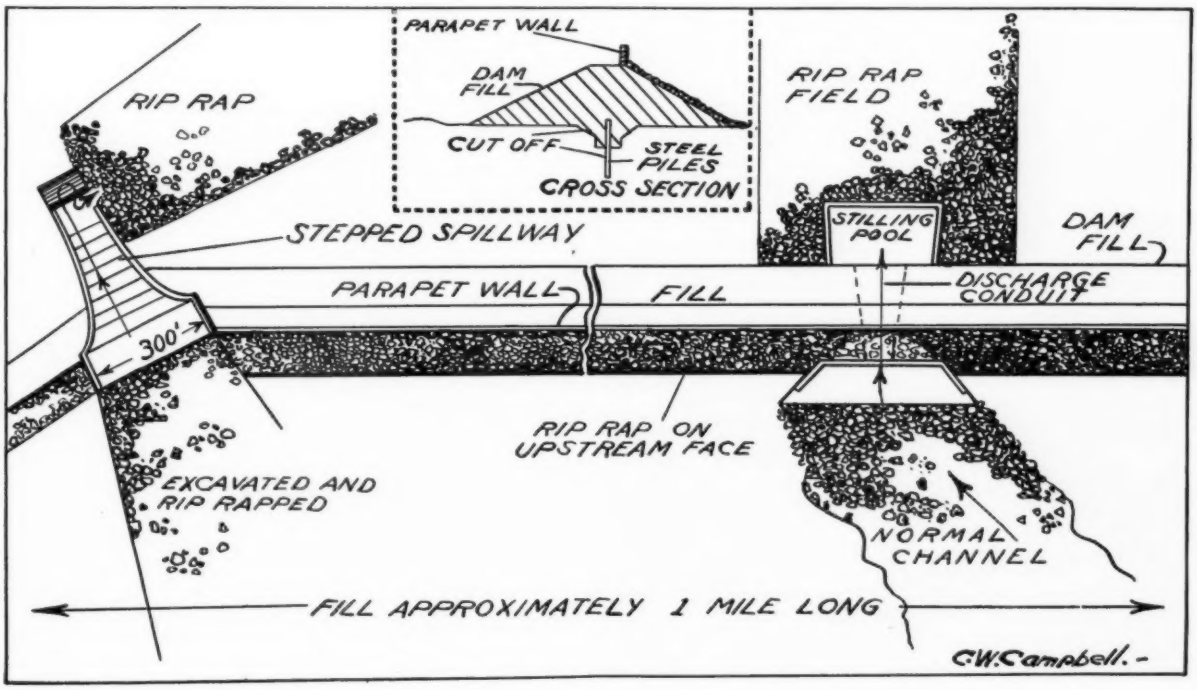
● *As described in this article, the Carlson Construction Company, at the start of the pile driving operations, used racks in the cut-off trench to hold the piling while driving. However the lengths of piling sticking up above ground interfered with the compacting operations in making the back fill so the plan of operation was changed and the use of racks discontinued.*

with a heavy roller made of railroad car wheels mounted side by side on an axle and pulled by a Caterpillar tractor. In addition to the clay-filled cut-off trench, the specifications called for 20-foot interlocking steel piling to be driven down along the center line to form a cut-off wall over the full length of the dam. Originally, Mr. Carlson had planned on driving the piling before filling the trench. He built racks in the trench to hold the piling while driving and this worked out nicely. But with five feet of the piling standing up in the trench, it was found that the packing and rolling operation on the clay backfill was performed under difficulties. Hence he changed the procedure and the trench was filled and packed with clay first, then the center line of piling was driven down through the new fill, and as a result operations were speeded up and a much better job turned out.

In addition to the cut-off wall along the center of the dam, all other concrete walls such as the discharge conduit and its face

● *At the borrow pit an Allis-Chalmers 70 tractor pulled a Caterpillar 48-inch elevating grader loading to Euclid Trac-Truks.*

● *Left: After the loose surface dirt and vegetation had been cleared away on the area to be occupied by the new dam, the Bucyrus-Erie dragline carrying a 2-yard bucket dug the mile-long cut-off trench. Below: This drawing, not to scale, shows the general layout of the Cherry Creek Dam. The clay-fill embankment is straight except at the extreme ends where low wings angle upstream. All surfaces likely to be subjected to wash are protected by rip rap. The discharge conduit is open at all times but will restrict the flow sufficiently so as not to exceed the capacity of the channel farther downstream.*



walls, the spillway walls, and the stilling pool, were completely outlined with inter-locking steel piling 20 feet long to prevent the possibility of water undercutting any part of the structures. The pile driving was handled by the Bucyrus - Erie 37-B machine, which by this time had finished the digging of the cut-off trench, holding a Vulcan No. 1 steam hammer on the piles. A ½-yard General crane worked with the 37-B, picking up the piles and hoisting them into position under the hammer. Steam for the hammer was supplied from a portable boiler which was carried along as the wall advanced. The hammer struck a blow of 15,000 foot-pounds and drove two piles at a time; the follower having a groove in it so that it would fit neatly on the piles.

Embankment Required 685,000 Yards of Clay

Specifications for the dam required that the fill be made of clay in which the sand content was held below a certain per cent. Each load of fill was checked and dumped either on the upstream or downstream side as determined by the percentage of sand. The clay, taken from borrow pits located from a half-mile to a mile upstream, was excavated by two Caterpillar elevating graders, a 48-inch and a 42-inch, loading to trucks. The 48-inch grader was drawn by an Allis-Chalmers Model 70 tractor and loaded to 8 eight-yard Euclid Trac-Truk dumping units. The smaller grader was pulled by a Caterpillar 60 and loaded to 16 dump trucks. The fill was started about the first of August and was completed by December 2.

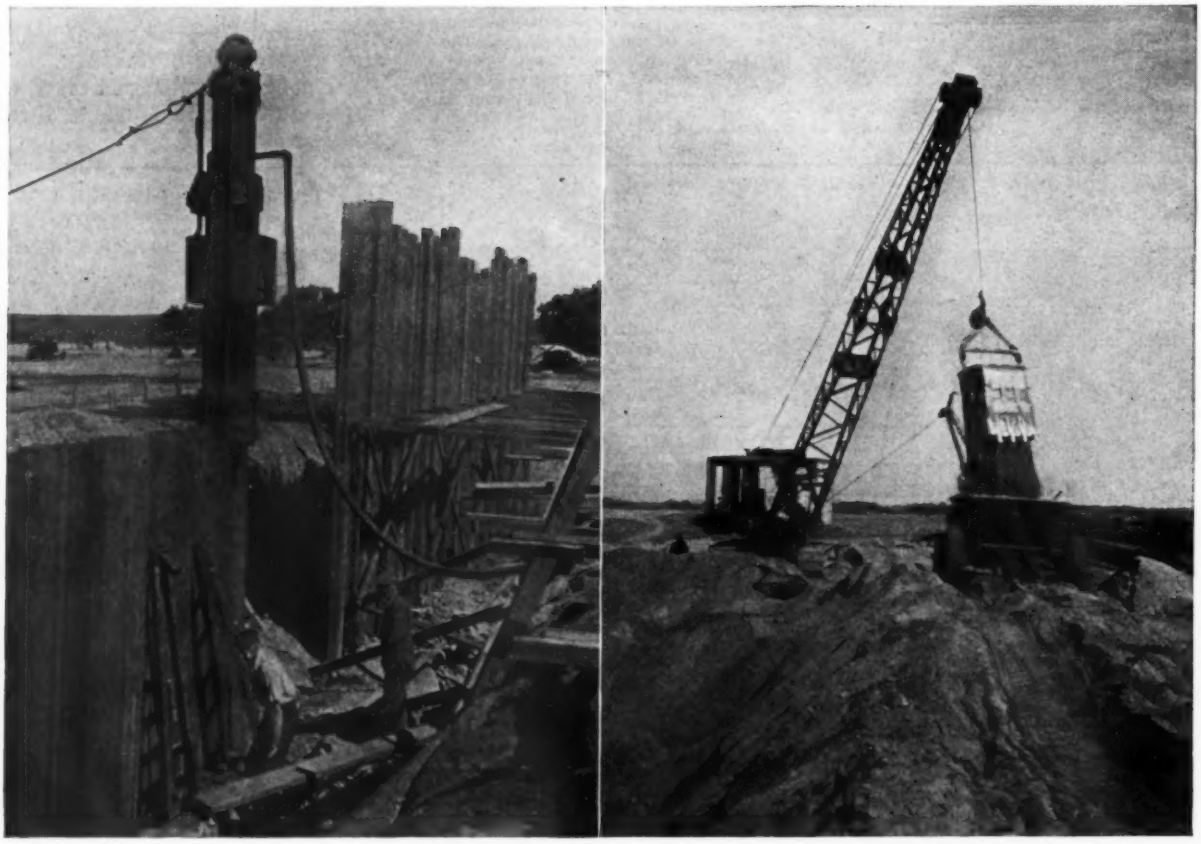
As each load of clay was dumped on the fill, it was spread by a Le Tourneau bulldozer, mounted on a Caterpillar Diesel 40, and a Caterpillar grader and ditcher unit. The clay was then sprinkled, rolled, and disked, leaving small furrows which received the next layer. In this way each layer, 6 inches thick, was locked to the ones adjoining above and below.

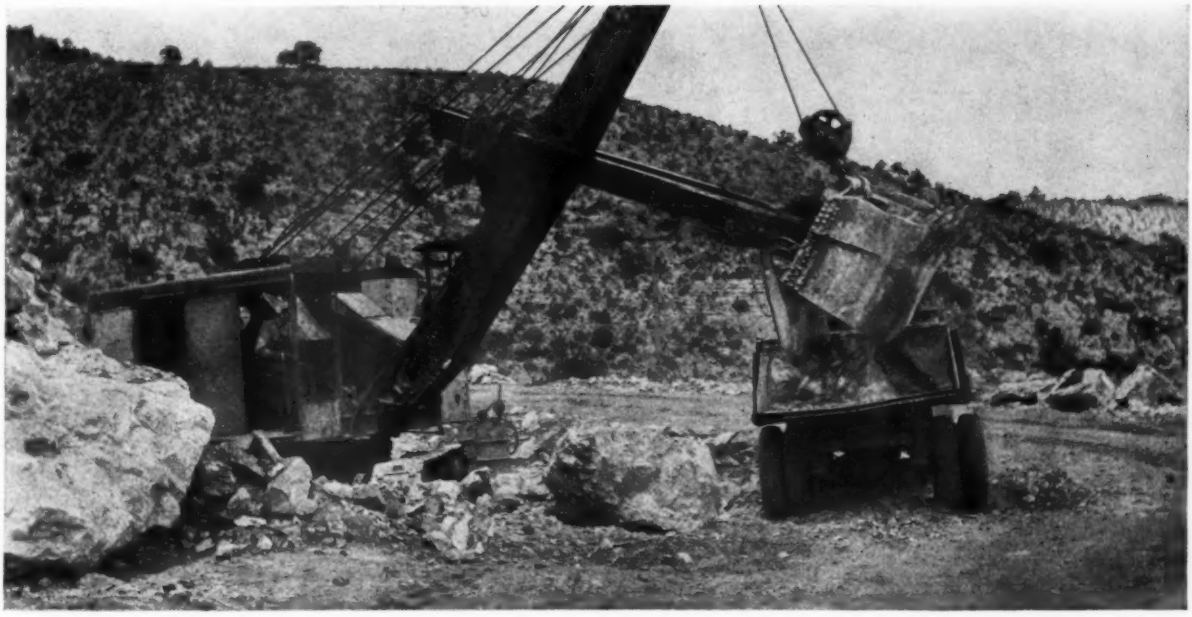
Near the center of the dam is located the discharge conduit which is about 300 feet long and high-arch-shaped at the intake end, being 17 feet 6 inches high by 14 feet wide at that point. The cross-sectional shape gradually changes to a low flat arch 40 feet wide and 9½ feet high at the discharge end. Spaced along the outside of the conduit are heavy, transverse, concrete ribs which, in addition to the face walls at each end, permit the clay fill to be packed closely around the tube and act as cut-off walls so that no water can leak around the outside of the conduit.

The discharge end of the conduit opens into a stilling pool, 170 by 110 feet wide and 25 feet deep. Both the General and the Bucyrus-Erie 37-B machines, carrying ½- and 2-yard dragline buck-

(*Continued on Page 114*)

● *Left: The 20-foot steel sheet piling was driven by this Vulcan No. 1 steam hammer. Steam was supplied from a portable boiler which was carried along as the wall advanced. Right: At this particular point in digging the cut-off trench, the Bucyrus-Erie dragline dumps the spoil in one of the Euclid Trac-Truks.*





● *Nearly five miles of twisting mountainous highway were widened and straightened, requiring the removal of approximately 40,000 yards of rock. The 1½-yard shovel had plenty of tough digging.*

Traffic Maintained!

Pearson & Dickerson widen five-mile section of Arizona mountain highway in spite of rock, rainy weather, high altitude, and lack of detour.

By D. W. Evans

WORKING 7,025 feet above sea level, Pearson & Dickerson Contractors, Inc., Prescott, Arizona, recently completed a 5-mile widening project on Arizona State Highway 79 near Mingus Mountain. This heavily traveled road connecting Jerome and Prescott, 30 miles apart, up to now has been noted for its hundreds of hairpin turns and eighteen per cent grades. This particular section of Highway 79 traverses a ridge between Woodchute and Mingus Mountain at an elevation of 7,025 feet above sea level. On the Jerome side of the crest for a distance of 4.85 miles the road has been widened and straightened, and surfaced with an aggregate base course. With four new bridges in place, it now is a modern, safe highway well able to carry a large amount of traffic.

Designated as Federal Aid Project No. 17, this section of road has been rebuilt by Pearson & Dickerson at a contract price of $125,000. The widening and straightening involved 40,000 yards of excavation, most of which was rock. The former narrow 12-foot strip of road is now a smooth-surfaced highway, at no place less than 24 feet wide.

Aside from the natural handicap of operating power equipment at such a high altitude, probably the major obstacle met by the contractor on this project

● *That section of Arizona State Highway No. 79 near Mingus Mountain was noted for its numerous hairpin turns and steep grades. With the completion of Pearson and Dickerson's contract, this section has been changed to a smooth-surfaced highway fully able to carry a large amount of traffic.*

was the necessity of maintaining traffic at all times. There was no alternate route available between Jerome and Prescott, nor was there any way of constructing a detour. Despite this burdensome handicap the contractors carried forward the work of excavation with virtually no delays either to their own crews or to passing cars and trucks.

Rock drilling was handled by a jackhammer crew of four men, using Timken drill steel, with 2½-inch starters, and Ingersoll-Rand S-49 Jackhamers. Air for the drills was supplied by one 320-foot Diesel-powered and one 220-foot gasoline-powered Sullivan portable compressors. Relatively small blasts of 40% and 70% Dupont dynamite produced satisfactory shattering of the rock encountered throughout the job. In many places rock blasted from the inner side of the road was bulldozed across the right of way and over the edge.

● *The road was widened at this hairpin turn by making a fill with rock. The trucks backed up hill with their load to the dump where the Caterpillar tractor and bulldozer leveled off.*

More often however it was necessary to haul the rock for distances up to 500 feet. In these cuts, the blasted rock was loaded by a Bucyrus-Erie 1½-yard 37-B gasoline-powered shovel to two 5-yard GMC trucks and one 5-yard Reo. These hauled the rock to nearby hairpin turns, dumping it there to be bulldozed into place. Often, because of the narrow road the trucks backed with their loads all the way to the dump. Notwithstanding this additional handicap, an average of 100 truck loads per day of 10 hours was maintained by the shovel.

Busiest pieces of equipment on the job were the three Caterpillar tractors carrying bulldozers. Two were Diesel 75s, one equipped with a LeTourneau—the other with a McCaffrey bulldozer; and the third was a 60, gasoline-powered, carrying an Ateco bulldozer. These three machines were used either to level off rock dumped by trucks serving the shovel, or to clear the road for traffic after one of the frequent blasts by the drilling crew. And occasionally where mud holes were encountered, mud holes that entrapped the passing tourist or truck, these same "Cats" helped the unfortunate ones on their way.

(*Continued on Page 110*)

● *Left: Bulldozing the rock and dirt into place. Right: On some of the narrower sections of the road, the shovel was able to cast the rock from the cut into the fill.*

Speedy *Slide* Removal

J. P. Holland, Inc., San Francisco, moves 50,000 yards of rock and clay in 19 working days with a Bucyrus-Erie 43-B shovel.

NATURE OFTEN protests at man's attempt to alter her facial contour. Because she does, J. P. Holland, Inc., San Francisco, has been extremely busy of late cleaning up a 50,000-yard slide on the Redwood Highway between Sausalito and San Rafael.

The original highway between these two Marin County cities wound its way up over the Corte Madera grade. Such a thorough job of winding was done, in fact, that there was a five-mile stretch of mountain road where it was extremely dangerous, and often suicidal, to attempt to pass another car. This situation was corrected, however, when the California State Highway Department undertook the construction of a new road over another route between these two cities some five years ago. The new highway is four miles shorter than the old, wide enough anywhere for three cars abreast, and has no sharp curves or steep grades that might create traffic hazards.

The new alignment crossed two ridges framing an inlet from San Francisco Bay through cuts 60 feet deep. The north wall of one cut was of rock. The steep hill rising above it, it now appears, was shale and clay. Rains and pressure against the rock wall finally weakened its resistance, and a huge crescent of rock, shale, and clay running 1,000 feet along the highway and arching 500 feet up the hill started to descend slowly into the highway cut. The slide got beyond control of routine maintenance forces, so

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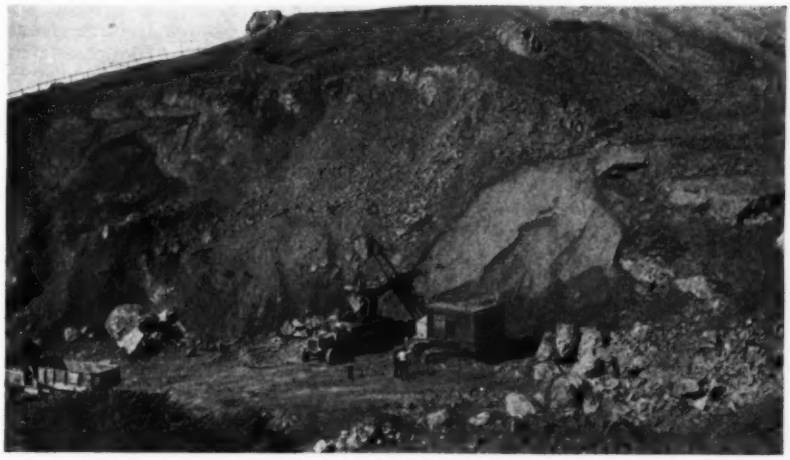

● *Top: Two-truck spotting enables the contractor to take full advantage of the shovel's output capacity. Note the empty truck at the left backing in behind the shovel. Center: The spoil from the slide was used to reinforce a long fill near the cut. Bottom: Every two minutes, for 16 hours a day, a loaded truck pulls away from the shovel.*

EXCAVATING ENGINEER

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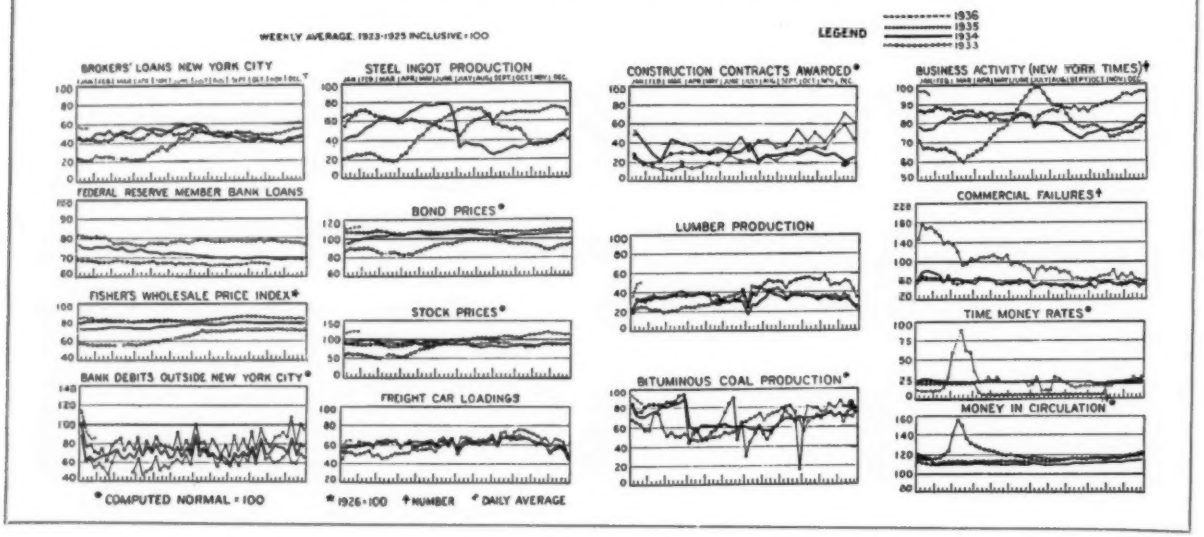
The Business Situation

AS WE LOOK ahead into the future that 1936 will bring, we are confronted by a rather unusual mixture of facts, figures, and psychology. Pressing upward is a seemingly irresistible accumulation of natural forces of recovery. Through the past six years, overshadowed by a constant fear of the future, both individuals and corporations have postponed purchases of both consumer and capital goods as far as it was possible to do so. Gradually, over a period of several years, this attitude has been changing, partly due to necessity, partly due to improvements making available more attractive merchandise, partly due to improved buying power, and energized by a changing psychology which sees better times ahead. Hence we are making more automobiles, building more homes, and manufacturing more of the modern machines that increase production and profit. As a result, more and more men are going back to work, and others are getting increased pay envelopes and feeling a new sense of security. And so we have a great increase in the production of woolen goods and a considerable one in the output of shoes, as well as an increase all along the line in other lines of consumer products.

Supplementing the natural forces of recovery, are the tremendous expenditures of Government which are of particular interest to the readers of *Excavating Engineer* because they so directly influence their business. From all indications, the government will continue this year, a volume of large engineering construction as great, if not greater, to that which established records the last several years. Work at Fort Peck, Bonneville, and Grand Coulee Dams, on the All-American Canal, Colorado River Aqueduct, Mississippi Valley Flood Control, Muskingum Watershed Conservancy Project in Ohio, Central Valley Project in California, Passamaquoddy Tidal Power in Maine, the Florida Cross State Canal, and the International Highway will continue. Now under contemplation are other great projects such as the St. Lawrence Waterway, the New York to San Francisco National Highway, a Nicaraguan Canal, as well as many another project for utilizing and improving our natural resources. That highway-construction is going ahead in 1936 at a tremendously increased pace is apparent to any reader who gave even casual study to the forecast presented in the January issue of *Excavating Engineer*.

Against all this we have ranged the old superstition of an election year being a bad year for business. In analyzing this threat we can only come to the conclusion that election years are bad years for business because they are years of uncertainty. Big business and little business hesitates to go ahead in election years because it is so difficult for them to forecast the rules of the game when making long time investments necessary in order to keep the wheels of business rotating. We can hardly see how the conditions of ordinary election years can apply in 1936. Certainly big business and little business and the man on the street has either developed the courage to face whatever uncertainty there may be in this election during his experiences of recent years or has been reduced to a state of perpetual uncertainty from whence he can never recover. We have seen our banks close and open, we have gone off the gold standard, we have seen the NRA rise and fall, agriculture was subsidized and unsubsidized, and seems about to be subsidized again. The National Debt has risen to dizzy heights, inflation has been hanging over our heads,

WEEKLY BUSINESS INDICATORS



we are about to pay the bonus; what possible change can a national election bring, that would lead us into a more turbulent or uncertain future? It seems to us that the natural forces of recovery have generated enough steam to override the psychological uncertainty of the coming national election. A great nation, its pockets bulging with unprecedented savings account balances, unused credit, and the soldiers' bonus, is ready to spend again on a fairly liberal scale. Big business and little business **must** meet this demand with the most modern products and production methods possible in order to maintain its place in the economic system.

Residential Building Best Since 1931

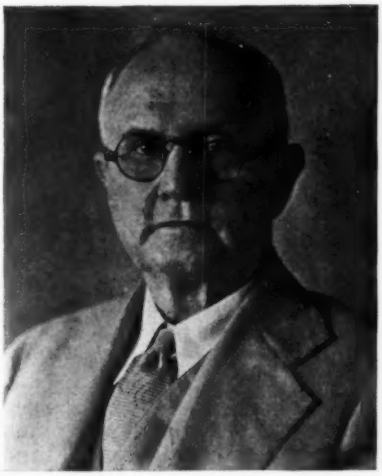
RESIDENTIAL building ended the year 1935 with a total greater than for any year since 1931. According to figures of F. W. Dodge Corporation, the volume of homebuilding operations, both new and alteration, totaled $478,843,100 in the 37 eastern states. This represented a gain of 92 per cent over the total of $248,840,100 reported for 1934. The 1931 total for the 37 eastern states aggregated $811,388,700.

For December, 1935, residential building amounted to $45,140,100. This was more than three times the total of $14,550,500 reported in the 37 states during December, 1934, and compares with only $39,695,200 for November, 1935.

For all classes of construction, the December total in the 37 states amounted to $264,136,500 as against $188,115,000 for November and only $92,684,900 for December 1934. In the December 1935 total which incidentally was the highest monthly volume since that reported for July, 1931, besides residential building, were included $124,506,000 for non-residential buildings; $76,386,700 for public works of heavy engineering types; and $18,103,700 for public utilities.

For the full year 1935 construction awards of all descriptions in the 37 eastern states amounted to $1,844,544,900 as against $1,543,108,400, a gain of almost 20 per cent between the two years. In the 1935 total, besides residential building, were included $675,488,600 for non-residential building; $578,541,800 for heavy public works; and $111,671,400 for public utilities. Comparable figures for 1934 follow: $543,031,800 for non-residential building; $625,044,500 for heavy public works; and $126,192,000, for public utilities. From these comparisons it is thus seen that the entire improvement in 1935 over 1934 was due to gains in residential and non-residential building as distinguished from engineering types which were actually undertaken on a lower scale than in 1934.

Elwood Mead



DOCTOR ELWOOD MEAD, Commissioner of Reclamation, died at his home in Washington, D. C., January 26, at the age of 78, following an illness of several weeks.

As a pioneer, teacher, administrator in the field of irrigation, Dr. Mead was renowned throughout the world. The influence of his research, innovations, and ideas is reflected in laws governing irrigation practice in the western United States and in many other parts of the world.

Dr. Mead, who had been Commissioner of Reclamation since 1924, was born January 16, 1858 at Patriot, Indiana. After graduating from Purdue University with a degree of Bachelor of Science in 1882 and a degree of Master of Science in 1884, he began his career as an assistant engineer in the Army on a survey of the Wabash River in his native Indiana.

Dr. Mead entered the irrigation field very shortly after his graduation from college becoming Professor of Irrigation and Engineering at the Colorado Agriculture College in 1886. Later he went to Wyoming as territorial engineer and served the state as its first State Engineer from 1888 to 1898. When the new State was organized, Dr. Mead as State Engineer proposed an entirely new water law for inclusion in the State Constitution, one which turned its back upon the common law principle of riparian rights which had thrown into confusion the legal status of water in the arid west. Under the Mead plan the State retained title to all water, surface and underground. Diversion from streams and all appropriations of water in Wyoming since that time have been under the control of State officials with water on a status similar to minerals and land.

Having entered the service of the Department of Agriculture as chief of the irrigation and drainage section, Dr. Mead served concurrently as Professor of Irrigation at the University of California for eight years. In 1907 he went to Australia as chairman of the State Rivers and Water Supply Commission of Victoria. Here, during his eight years of service, he inaugurated a comprehensive water conservation and reclamation plan which has served as model elsewhere in the British Empire.

Dr. Mead returned to United States in 1915 and resumed his teaching at the University of California. He left the University in 1924 when President Coolidge appointed him Reclamation Commissioner. The largest construction projects undertaken during his period as Commissioner were the building of Boulder Dam and Grand Coulee Dam, to mention only two of numerous projects.

Dr. Mead was a past director of the American Society of Civil Engineers; a past president of the American Society of Engineers; a member of the American Society of Agricultural Engineers; and the British Institution of Civil Engineers. He held honorary degrees from Michigan as Doctor of Laws and from Purdue as Doctor of Engineering. He is survived by his widow, Mrs. Mary Lewis Mead, and five children.

Old Times and Old Timers

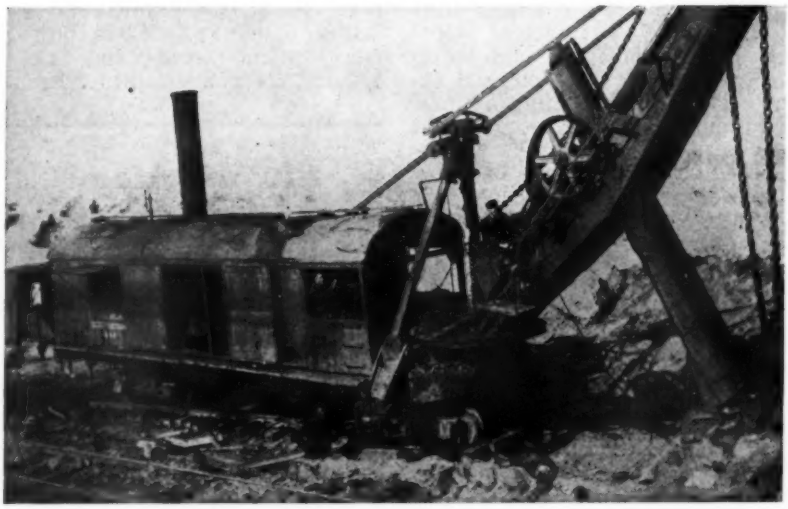
More About "Greasy Mary"

LACK OF SPACE has prevented us from publishing previously a letter from Old Timer Oscar Weinberg of Cadiz, Ohio, who wrote us in answer to our question "Did you help run 'Greasy Mary' in 1913?" which appeared in the July, 1935, Excavating Engineer. He writes as follows:

"In the July issue of Excavating Engineer there is an inquiry about runners of old 'Greasy Mary,' particularly as to the whereabouts of Jesse Palmeter. I notice too that the inquiry mentions old 'Greasy' as being a 70-C. This is not correct as this shovel was one of the old style 70's as will be noted from the accompanying photograph.

"In January, 1913, Barney Miller, runner; Ed Casey, and George Reed, cranemen; Frank Whalen, fireman, and myself set up old 'Greasy' at Camp No. 1 which was about 1½ miles up grade from Tucker, Utah, and about 5 or 6 miles down the mountain from Soldier Summit. The shovel was to be operated on a grade reduction job for the Denver and Rio Grande Railroad. The Utah Construction Company had the contract for the work which was located between Thistle Junction and Helper, Utah.

"After assembling 'Greasy Mary', which incidentally was shipped from the Bucyrus factory in 1904, and getting her ready to run, Miller, Casey, and Whalen went on a new Marion 61, and Reed and myself stayed on the old veteran.



"I operated 'Greasy Mary' from January until the first of May, 1913. George Reed craned until along about March 1st and then went with the Nevada Consolidated Copper Company at Ruth, Nevada. Leo Strangwald took his place as craneman and by this time James R. Brady was firing for me. The accompanying photograph of the 70-Ton shovel shows Leo Strangwald craning and myself running it.

"Some of the other shovel men on this job, besides those already mentioned, were Ike Brassington, runner; 'Peruna' Tom McCune, craneman; and James Putnam and Guy Roby, firemen.

"I heard Jesse Palmeter's name mentioned by several of the boys on the job but never met him. Perhaps he went on old 'Greasy' after I left.

"When work at Camp No. 1 started 'Red' Chapman was walking boss. He was followed by Dick Huggard who in turn was relieved by Van Patton. Bill Meeker was master mechanic, and Bob McElvaney was the general superintendent.

"I thought the readers of the Old Timers' section would be interested in this photograph of 'Greasy Mary' and also in the picture taken at Camp No. 1 near Tucker. This shows me standing in front of one of the shovel men's sleeping tent. Note the beard and the long hair.

"I have seen only one 'Greasy Mary' operator since I left her and that was Jack Christianson whom I met here in the Ohio coal fields about eight or nine years ago. He had operated old 'Greasy' at Thistle Junction before she was sent up to Camp 1."

We appreciate your interesting letter and photographs and believe our readers will find them as interesting as we do.

Digging the Panama Canal

SOMETIME AGO we published in this section a photograph of a Marion shovel, ICC No. 252 at work on the Panama Canal, sent in by Old Timer H. H. Hunter. Evidently this has recalled to Old Timer Steve Pode of Malone, New York, the years he spent on a shovel digging away on that huge dirt moving job, for he writes as follows:

"In May, 1907, I embarked on the S. S. Allianca for the Panama Canal hired as a shovel engineer. Incidentally this steamship was formerly owned by the Ward line and had some exciting experiences during the Spanish-American War for she was the first one chased and fired at by the Spaniards. With her speed of 13 knots she was fast enough to get away from the slower Spanish ships.

"We were eleven days getting to Panama what with rough weather and all but one boiler going wrong. The boat tipped so much we couldn't understand why she didn't keep from going over.

(Continued on Page 109)

Field Notes

Core Drilling Device for Concrete

IN ORDER to determine whether or not concrete poured in Colorado River Aqueduct structures is up to the standard set for it, a new core drilling device, shown below at the right, has been put into use by the District.

This machine makes it possible to check up on the quality of the concrete after it has been poured and cured. For the most part, the cores cut have shown the concrete to be in excellent condition. But where defects are found, the cores cut by this machine make it possible to study the various types of imperfections and to remedy them. Blocks, six by twelve inches, are regularly cast for compression tests from concrete being placed in Aqueduct sections, but these specimens give no idea of the texture or density of concrete in place as it may be affected by various operations in placing it.

Thus, this machine, which carries a bit six inches in diameter, set with approximately $3500 worth of black diamonds, and revolving under slight pressure is of great value for checking up on the concrete. The diamond-studded bit is capable of cutting the hardest stone or reinforcement which may be encountered.

Cores are cut from any spot selected in the concrete, already in place, along the great Aqueduct. The inset shows a typical core hole in the tunnel lining, exposing solid rock behind the concrete.

—*K. Campbell.*

Oxygen Lance Speeds Stone-Drilling Operations

FROM time to time the need arises for drilling holes into or through granite when it is difficult or uneconomical to employ regular stone drilling methods. It has frequently been found that the use of the oxygen lance will do such work very nicely. There are occasions when it would be false economy in time or money to bring regulation rock drilling tools onto a job, or where the material is so hard as to make ordinary methods both difficult and tiresome.

In one instance a company had a contract to install floodlighting on a newly constructed court house. It was necessary, during the course of this work, to drill holes through some granite blocks 14 to 24 inches thick. This stone was of such a character that "star" drills would hardly penetrate and lost their sharpness almost from the first blow of the hammer. It looked as though the job would develop into an endurance contest between the workmen and the granite, with the odds on the granite.

The floodlighting company, as a result of previous experience on similar work, immediately turned to the oxygen lance.

The first hole, 5½ inches in diameter, was drilled 15½ inches deep in 29 minutes. The next hole, similar in size but only 14½ inches deep required but 28 minutes. The officials did not even try to estimate how many hours would have been necessary to drill through the rock by mechanical means. This job is typical of how use of the oxygen lance can often save hours of time and trouble.

The technique for drilling rock by means of the oxygen lance is essentially the same as for drilling ferrous materials. The action is, of course, somewhat different. The burning lance pipe heats the rock sufficiently so that it either melts or reacts with the hot slag from the lance pipe to form a slag mixture which melts more readily than the rock.

Because of the vast varieties of rock and the differences of characteristics even in one type, no exact procedure can be given; because each type of rock reacts differently to the heat produced. Some rocks are lower in melting point than others, while the slag produced may be either liquid or sluggish in character.

In general, however, the same apparatus is used for drilling rock as for drilling steel or iron. Oxygen cylinders should be manifolded together and fitted with the recommended heavy flow oxygen regulator. About 25 to 50 feet of ⅜-inch heavy duty oxygen hose is recommended. For connecting the hose to the lance, a reducing coupling and standard oxygen hose connection are required. By means of this coupling the hose is connected to a piece of 1-inch steel pipe, (it may be bent at right angles at the outer end) about 3 feet long. Then to this threaded outer end a 1x¼-inch reducer is attached. Into the reducer is screwed a length or more of ¼ or ⅛-inch steel pipe which forms the lance proper.

When all is in readiness, the outer end of the ¼-inch pipe is heated to a bright red heat either by an oxy-acetylene blowpipe flame or by other means. The oxygen is then turned on slowly. The pipe will burn, and in burning will create the necessary heat. To start drilling, the burning end of the lance is simply placed aginst the rock at the desired point. In the case of granite, the rock will melt and come out of the opening as a rather sluggish slag.

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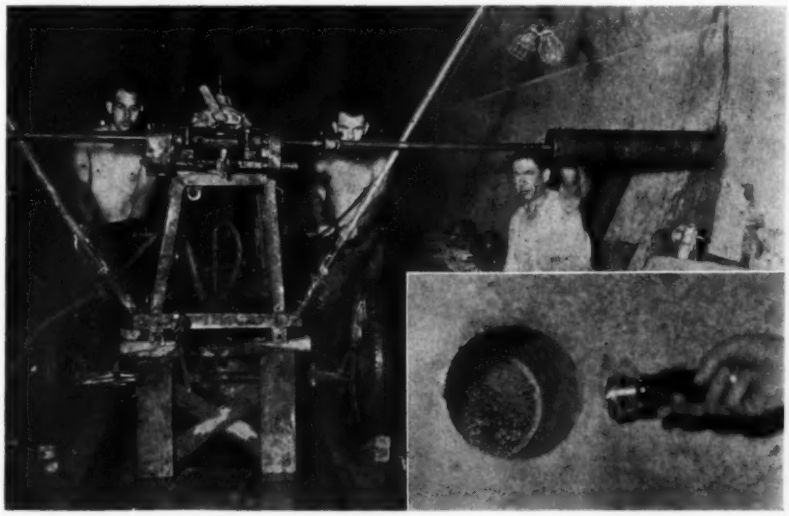
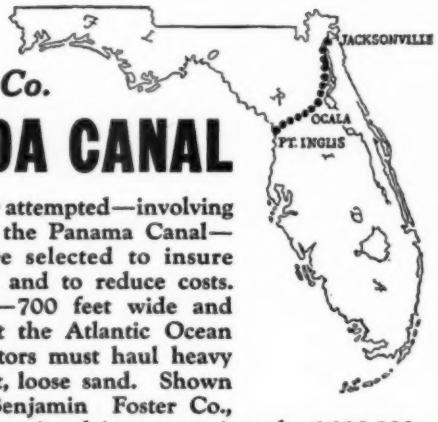


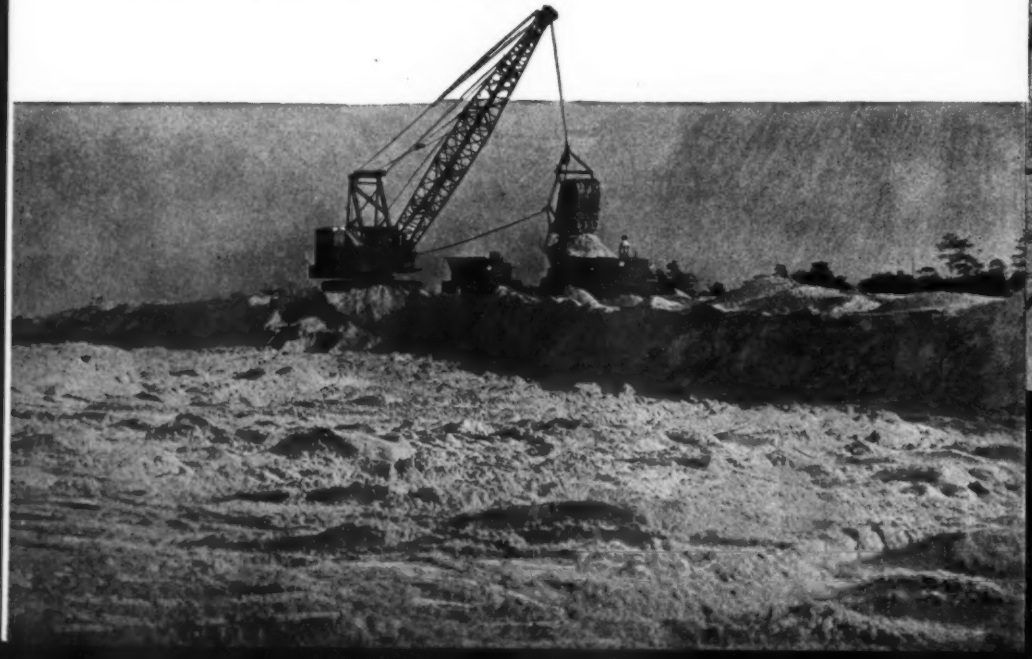
OK! WE'LL TAKE Allis-C



says Benjamin Foster Co.

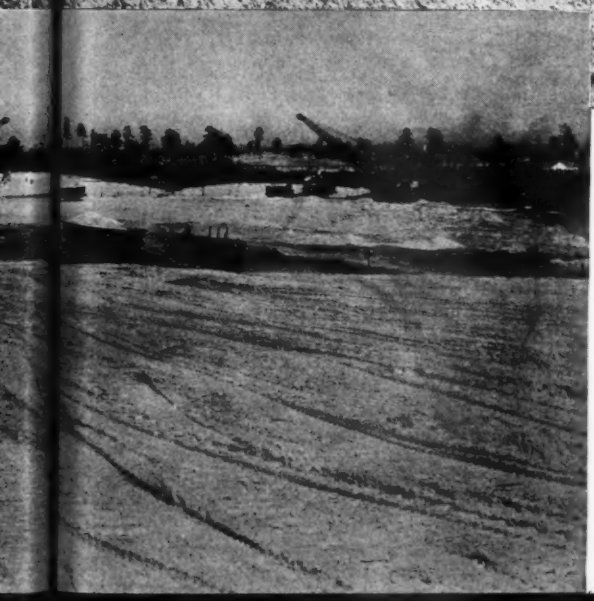
ON THE FLORIDA CANAL

On the largest dirt moving job ever attempted—involving nearly twice as much yardage as the Panama Canal—Allis-Chalmers Oil Tractors were selected to insure completion of the work on time, and to reduce costs. On this gigantic 206-mile canal—700 feet wide and 30 feet deep—which will connect the Atlantic Ocean with the Gulf of Mexico, the tractors must haul heavy loads up 10 per cent grades in soft, loose sand. Shown here are some of the units of Benjamin Foster Co., holder of the largest single contract, involving approximately 5,000,000 yards. A fleet of Allis-Chalmers Model "L-O" Oil Tractors keeps the dirt moving at high speed—with such obvious advantages as instant starting, simplicity of design and less maintenance—due to the low compression system employed in A-C Oil Engines. Allis-Chalmers Wagon Tracks were also chosen—they are mounted on rollers and will resist the grinding wear of sandy conditions. Just as A-C Oil Tractors are setting the pace on the world's largest job—they will set the pace for cutting costs and increasing production on YOUR job.



LOW COST DIESEL FU

Allis-Chalmers Oil Tractors
the exclusive advantage of gas
tractor simplicity combined
Diesel Fuel economy. Low
pression means instant sta
and less maintenance.



NO. 14 LOADS UP. A fleet of fast-stepping "L-O'S" keeps the shovels busy as the Florida Canal gets under way. This is unit No. 14 of the Benjamin Foster Company fleet. Allis-Chalmers wagon tracks—mounted on rollers—stand up in the sand.

BRANCH HOUSE AND DEALER SERVICE

In addition to a wide-spread dealer organization, extending from coast to coast, Allis-Chalmers has factory branches in every territory to provide A-C owners with prompt, efficient service—UNDER FACTORY SUPERVISION.

ALLIS-CHALMERS OIL TRACTORS

TRACTOR DIVISION—MILWAUKEE, U. S. A.

EQUIPMENT
You Ought to Know About

New Excavator Features Speed, Strength, Stamina

INTRODUCED by Bucyrus-Erie Company of South Milwaukee, Wis., at the 1936 Road Show held in Cleveland, the 48-B is the newest addition to their complete line of excavating machines.

It is the claim of Bucyrus-Erie engineers that the new 48-B is in every way a 1936 machine, with greater speed, more power and stamina than any other excavator of its size now on the market. Output is said to be far ahead of machines of earlier design, with a new, smooth swiftness of acceleration and control that gives more digging cycles per minute and a big increase in yardage every day.

It is claimed for the 48-B that there has never been a machine near this size that the operator could handle as easily, as rapidly, or as accurately. Instantly responsive to the operator's will, with all unnecessary weight eliminated, with hoist, crowd, and swing coordinated and balanced for the fastest possible digging cycle, this new excavator provides alert, continuous, high-speed performance that materially lowers dirt moving costs.

The 48-B is easily and quickly converted as shovel, dragline, clamshell, or lifting crane. The high A-frame with special dragline boom-suspension tackle reduces stresses in the boom and lessens the weight at the boom point. The dragline-crane boom is built of alloy-steel angle chords with welded tubular cross-bracing and is available in lengths from 50 to 100 feet.

Great strength has been built into the shovel front end. The all-welded steel boom with its wide-spread foot, straight-line transmission of stress, centrally located shipper shaft, and twin, 42-inch, live sheaves, is properly proportioned to stand up to heavy-duty service. Arc-welded outside handles hold the dipper firmly with a two-fisted grip as it cuts swiftly through the hardest bank. The powerful, positive, chain crowd makes available for use every inch of reach and high lift.

There is choice of three mountings—standard, oversize, and special oversize. Slide-in cats permit quick shipment on a single car without dismantling. All sizes are simple, powerful units that give fast moves and quick maneuverability. Gradual or sharp turns are easily made—steering is from the operator's station with the cab in any position.

128 anti-friction bearings — more than has ever before been used on an excavator of this size —are to be found on the 48-B. This assures minimum wear on all moving parts and less frequent adjustments.

Also in the 48-B, Bucyrus-Erie introduces Perma-speed control, a new development in smooth and accurate controlling of clutch and brake. With a big modern power plant making more speed available, it was necessary to back this speed up with a new kind of control to coordinate each part of the cycle to give smooth, balanced performance. Perma-speed control means that the operator has in his hands, safe, sure, and accurate control of every motion of the machine, that the adjustments he makes "stay-put" till he changes them, that the operating levers are conveniently located and move easily at the touch of a finger, that fatigue-slow-down need never cut the big output built into this machine.

Carrying shovel equipment, the 48-B has a working weight of approximately 125,000 pounds. As a dragline, the machine handles buckets up to three yards in size. Complete information regarding the 48-B may be had by writing the manufacturer. This may be done conveniently by using one of the postcards bound in this issue.

Improved Chipping Goggles

CHICAGO Eye Shield Company, 2298 Warren Blvd., Chicago, Illinois, announces an improved wide-vision chipping goggle made for impact-hazard work and equipped with a super-safety lens that does not change direction of light rays passing through the lens. A number of other practical improvements have been incorporated in this goggle, Cesco No. 220, that insure greater safety, wearing comfort and maximum usefulness. The shape of the eye-cups allow natural, full and wide vision. The goggles are close fitting and edges contacting the face have a pure gum cushion binding. Super-safety lenses are a scientifically designed optical product and afford maximum protection with no interference to the vision of the wearer. The curvatures are such that the lens is entirely free from focus and the optical center is located so that the line of sight for an eye looking straight ahead

through the lens suffers no deviation. These lenses are made from a high quality crown glass, free from bubbles and striae, and are placed through a special hardening process which greatly toughens the glass, enabling the lenses to withstand severe blows and impact hazards.

Road Maintainer

THE FWD Road Maintainer model illustrated below is particularly fitted for road maintenance and general hauling states The Four Wheel Drive Auto Company of Clintonville, Wisconsin. Underneath the hood is a sturdy 85-hp. motor. The wheelbase is 148 inches and the heat-treated frame is equipped with a 2½-yard dump body. Located transversely under the center of the unit is a hydraulically operated 10-foot spring scraper. Six forward speeds and two reverse are provided by a sliding gear type transmission. This arrangement really gives three maintaining speeds and three hauling or road speeds.

The unit is a multi-purpose one. It can be used for grading with the underbody blade; as a power unit to haul trailers, ditch graders, mowing machines and other specialized equipment; to haul loads, such as snow fence, gravel

and construction equipment; also as a power unit for pushing a snow plow.

Safety and dependability are further assured through the added traction of four-driving wheels, booster-operated, hydraulic brakes, and 9.75x20-inch dual tires. Beauty is added to utility through the eye-pleasing lines of the streamlined fenders, hood and cab.

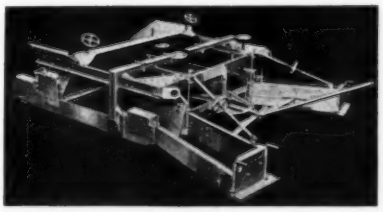
Blaw-Knox Road Finish-Spreader

BLAW-KNOX COMPANY, Pittsburgh, Pennsylvania, has acquired the patent rights on the machine formerly known as the Nickerson road finisher, which will be called in the future the Blaw-Knox road finish-spreader. This machine will be manufactured in the company's shops at Blawnox, Pennsylvania, and will be sold through the company's own sales force and through its distributors.

The Blaw-Knox road finish-spreader is manufactured in two sizes, models "A" and "B." In the larger size the width of spread can be varied from 5 to 15 feet, the smaller size, 4 to 10 feet.

It can be used for spreading and finishing all kinds of plant mixed material, as well as stone, slag and gravel. It is adjustable for any shape of crown and the cross section can be readily changed while in motion.

The Blaw-Knox road finish-spreader, states the manufactur-



er, represents the quickest and most effective machine yet developed for the spreading of paving material on roads. In operation it is attached to the truck and spreads material while the truck is drawn forward during the dumping operation. Less than three minutes are required for the entire operation of attaching to the truck, spreading and detaching. It is portable and may be dragged from job to job on its own wheels.

Medium-Pressure Acetylene Generator

A SMALL-SIZE medium-pressure acetylene generator for portable or stationary service has just been announced by The Linde Air Products Company, 30 East 42nd Street, New York. Known as the Oxweld Type MP-6 Medium Pressure Generator, this latest addition to the Oxweld line of generating equipment has a 50-lb. carbide capacity with a double rating of 100 cu. ft. of acetylene per hr. Developed for portable or stationary use with any type of oxy-acetylene cutting or welding apparatus, it meets the demand for small, rugged, low-priced generating equipment of modern design.

A handwheel at the generator top makes it possible to control the carbide feed so that acetylene at any desired pressure up to 14 lb. per sq. in. may be obtained. The carbide feeding mechanism incorporates the same principle of gravity type, pressure diaphragm-control as the larger Oxweld Types MP-4 and MP-5.

Special automatic controls make the Oxweld Type MP-6 Generator particularly safe to operate. It has been tested and accepted by the Underwriters' Laboratories at the double rating for generating capacity.

The generator can be mounted on a truck for transportation from job to job, or fitted for permanent installation to supply medium-pressure acetylene through pipe lines.

Traction Treads

W. A. RIDDELL Company, Bucyrus, Ohio, announces the production of a J & S Traction Tread for single pneumatic tires. According to the announcement this new tread is very similar in construction to the J & S Traction Treads for dual pneumatic tires which Riddell Company has been manufacturing for quite some time. The new tread is so designed as to give maximum flexibility, it is simple in construction and is very easily mounted. Wearing shoes are made of special alloy steel castings; links and pins are made of high carbon heat treated steel.

The inside of the tread plate is a smooth surface curved to fit the contour of the tire. The use of these traction treads does not mar or injure the tire in any way, in fact the manufacturer states that special tests of machines doing heavy construction work show that the use of the treads preserves the life of the tire. This new J & S Traction Tread for single pneumatic tires can be furnished to fit all standard tire sizes.

SHOTS *from the Firing Line*

Road Show for 1936 Surpasses All Others

Excellent attendance of highway builders from all parts of the world reported.

BILLED as the "Old Fashioned Road Show" by the American Road Builders' Association but proving to be anything but "Old Fashioned," the Road Show held in the new Exhibition Hall of the Cleveland Public Auditorium, January 20 to 24 gave every evidence of heralding an era of prosperity. Not only was the attendance of highway contractors, officials, and engineers highly pleasing, but also the unusually large number of exhibitors lent an atmosphere of confidence not found at other Road Shows of the past four or five years. Approximately 200 manufacturers displayed the latest in highway building equipment of all kinds.

The convention session was wisely segregated into groups according to special interest, sessions being devoted to farm-to-market roads, highway contractors, planning, technical, educational, Pan-American, city officials' county highway officials' and were rounded out with several general sessions which held wide interest. Tax diversion came in for its rightful share of attention as did the effect of Government regulations on cost of work and contractors' organization. Papers on these subjects were presented by Highway Commissioner Van Wagoner of Michigan and New England Road Builders' Association Secretary Frederic Hoitt. Thomas H. MacDonald, Chief of the Bureau of Public Roads, gave a splendid presentation of "Federal Highway Appropriations." T. W. Allen, Chief of the Division of Management, Bureau of Public Roads, presented a paper, "An Economic and Statistical Analysis of Construction Expenditures," which was widely acclaimed. Not one of the five days of the convention failed to see at least a dozen presentations of interesting topics by well known authorities, which speaks for the thoughtful planning of the committees on arrangement.

Among the exhibitors and contributing manufacturers the following Excavating Engineer advertisers were included: Allis-Chalmers Manufacturing Company, Athey Truss Wheel Company, Austin-Western Road Machinery Company, Bucyrus-Erie Company, Caterpillar Tractor Company, Chain Belt Company, Hercules Powder Company, Ingersoll-Rand Company, Koehring Company, A. Leschen & Sons Rope Company, Linn Manufacturing Company, Sauerman Brothers, Inc., Socony-Vacuum Oil Company, Sullivan Machinery Company, Timken Roller Bearing Company, Twin Disc Clutch Company, U. S. Steel Corporation, and Wellman Engineering Company.

Sunrise on the desert. E. C. Ferguson's Model 33 Bucyrus-Armstrong churn drill work 24 hours a day sinking 6-inch holes 20 to 24 feet deep through cemented gravel on Schedule 12 of the Colorado River Aqueduct. Three Companies, Inc., hold the contract for this section of cut-and-cover conduit and excavate the blasted gravel with a 4-yard dragline.

Government Takes Over Mason & Walsh Work at Fort Peck

THE GOVERNMENT contract with the Mason & Walsh Construction Co. for the excavation and preliminary lining of the diversion tunnels at the Fort Peck Dam was terminated by a mutual agreement effective at 4:00 P.M., January 15, 1936. The hour coincides with change of shifts and was chosen purposely so as to permit continuity of the work. The Government will retain most of the contractor's employees and will take over all of the plant, machinery, construction supplies and material on hand.

The Mason & Walsh contract provided for the construction of four tunnels with a total length of 25,294 feet. The agreement contemplated the boring of exploratory pilot tunnels and their subsequent enlargement to a diameter of 32'2". A lining of plain concrete 21 inches thick was to be placed. The construction of inlet and outlet portal structures and control gate shafts were also included.

A subsequent contract was to be let for the placing of additional lining of steel plates embedded in cement grout and concrete.

The contractors have met their contract schedule of progress which called

RECORDING HISTORY

"HERCULES" (Red-Strand) Wire Rope has aided in the making of history many times before, but here at Mt. Rushmore we find it helping to record it.

The supreme test of a wire rope's dependability is when it is entrusted with so priceless a thing as a human life. And you can "bet your life" (that's what these workmen are doing) that "HERCULES" (Red-Strand) Wire Rope will live up to the confidence placed in it.

Wire rope safety is ever a vital factor, even when human lives are not at stake, for a safe rope is one that is dependable — and that means economy.

Made only by

A. Leschen & Sons Rope Co.

Established 1857

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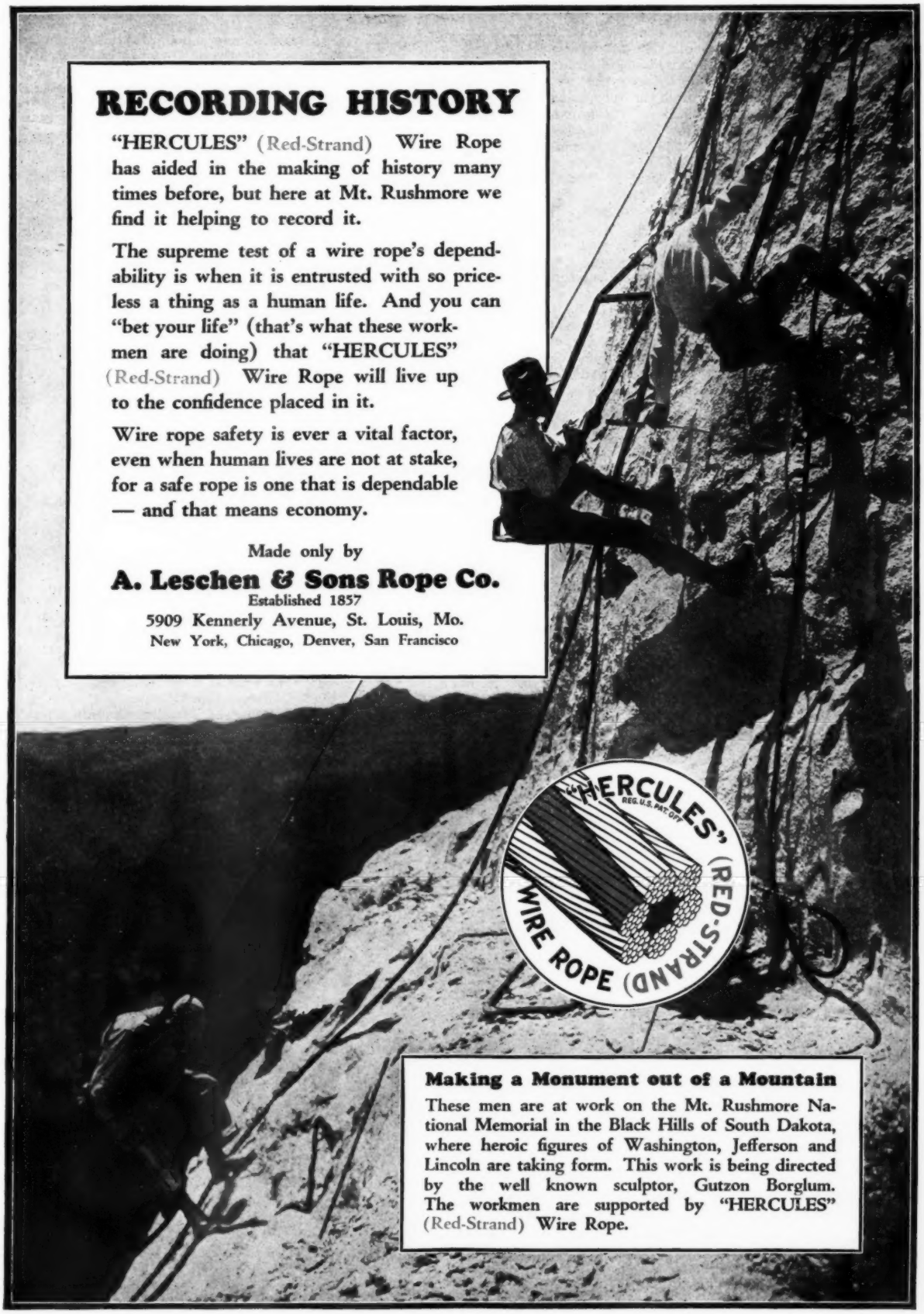


Making a Monument out of a Mountain

These men are at work on the Mt. Rushmore National Memorial in the Black Hills of South Dakota, where heroic figures of Washington, Jefferson and Lincoln are taking form. This work is being directed by the well known sculptor, Gutzon Borglum. The workmen are supported by "HERCULES" (Red-Strand) Wire Rope.

For your convenience in writing to A. Leschen & Sons Rope Co., you will find a card bound in this issue.

for completion in April, 1937. The letting and performance of a second contract for lining the tunnels would take another year and make it impossible for the Government dredges to effect closure of the river channel through the dam until 1938 or possibly 1939.

Excellent performance of the four dredges during the summer of 1935 indicates that early completion of the diversion tunnels will prevent costly delay in building the dam. Revision of construction plans for the tunnels whereby the steel linings in three of them have been eliminated, and whereby a 36-inch thickness of reinforced concrete will be placed in one operation, will insure completion of the tunnels in 1937 and permit the closure of the dam to be effected during the same construction season.

Since no satisfactory agreement could be reached for work under the revised plans, the contract was terminated. Work done by Mason & Walsh to date includes: completion of the four pilot tunnels, the outlet portal structure, much of the inlet portal structure, excavation of the gate shafts ⅝ of their depth, enlargement totalling approximately 7,350 lineal feet and placement of about 5,200 lineal feet of concrete linings. The heading of No. 1 tunnel has advanced over 2,000 feet from the outlet portal.

Additional Reclamation Projects Awarded in January

A CONTRACT for the construction of Alamagordo Dam on the Carlsbad (New Mexico) Reclamation project was awarded January 25 to the Hallett Construction Company of Crosby, Minnesota, for $1,132,547 by the Bureau of Reclamation.

The Alamogordo Dam will be an earth and rock fill structure 135 feet high and 1,550 feet long across the Pecos River near Fort Sumner, New Mexico. It will serve as a replacement for the old and leaky McMillan dam, 150 miles downstream, and will store about 130,000 acre feet of water for use of irrigators on the Carlsbad project. A dike about 1,350 feet long and with a maximum height of 30 feet will extend from the left abutment of the dam along the rim of the reservoir. The spillway, a concrete lined open channel, will be located in the right abutment.

Other important contracts awarded by the Bureau during January included: raising of Arrowrock Dam, Boise, Idaho, project, to T. E. Connolly, Inc., of San Francisco, for $395,040; drilling four tunnels on the Black Canyon Canal, Payette Division, Boise, Idaho, project, to J. A. Terteling and Sons, of Boise, for $292,415 and construction of two canals on the Ogden River Utah, project, also to J. A. Terteling and Sons for $424,978.

WALTER S. HARDWICK

ENROUTE to Texas, for a conference with other members of his newly organized W. S. Hardwick Construction Company of Texas, W. S. Hardwick and his associate D. A. Chernus were among the unfortunate victims of an airliner crash in Arkansas on January 14th.

Starting as a dragline operator for the W. E. Callahan Construction Company, Mr. Hardwick readily assimilated the details of excavation work as carried on by that efficient organization, and quickly became Foreman and then Superintendent.

Locating at Beardstown, Illinois, in 1925, Mr. Hardwick started in the construction business for himself successfully completing many small drainage jobs. His first large dragline work was undertaken in 1930 at Eldred, Illinois, for the Eldred Drainage and Levee District.

In 1932, while continuing to operate his W. S. Hardwick Construction Company, he formed a co-partnership with F. M. Horton of Princeton, Illinois, known as Hardwick and Horton. Both concerns, headquartered in the Arcade Building, in St. Louis, Missouri, earned favorable recognition throughout the country as they successfully completed many large sections of levee on the Mississippi from Illinois to Louisiana, and other dragline work about the Central States. At the time of his death Mr. Hardwick had just successfully finished large excavation contracts near North Platte and Paxton, Nebraska.

The new company, Mr. Hardwick had just organized in Texas, is to handle the large Maverick County Water Control and Improvement District Project, on the Rio Grand River at Eagle Pass.

Walter Hardwick was born in southern Kentucky, January 18th, 1891. Besides Mrs. Hardwick he leaves two children, Louise, 11 years, and Walter Samuel, Jr., 9 years, of Beardstown, Illinois.

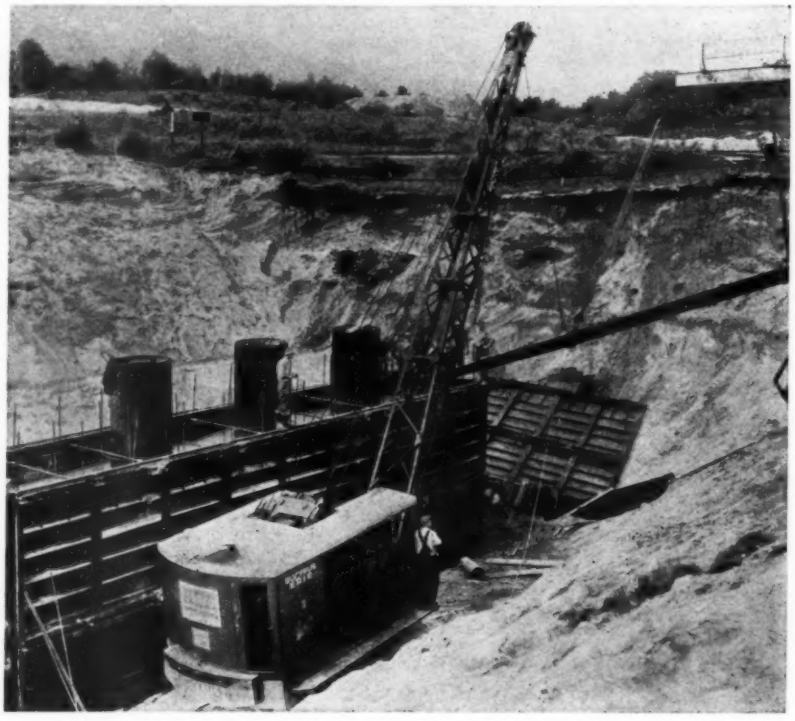
DAVID A. CHERNUS

DAVID A. Chernus 37, lived with his mother, sister, and brother, in St. Louis, Missouri. Chernus Construction Company was a co-partnership of the brothers, David A. and Maurice C. Specializing in concrete work they were quite successful on road and bridge work in Illinois and Missouri.

During the past few years they combined with W. S. Hardwick Construction Company to do the concrete end of the Hardwick contracts. Their offices were maintained in the Cotton Belt Building, St. Louis, Missouri.

HERMAN GUNTHER

HERMAN Gunther, of Gunther & Shirley, associated with the W. E. Callahan Construction Company, contractors on the first section of the All-American Canal, died November 25 at his Los Angeles home, at the age of 57. For many years he had been actively engaged in the contracting business chiefly in railroad and other heavy construction both in this country and in Canada and Cuba. As Peterson, Shirley & Gunther of Omaha, Nebraska, the company completed many railroad contracts, and associated with the W. E. Callahan Construction Company in the building of Madden Dam in Panama.

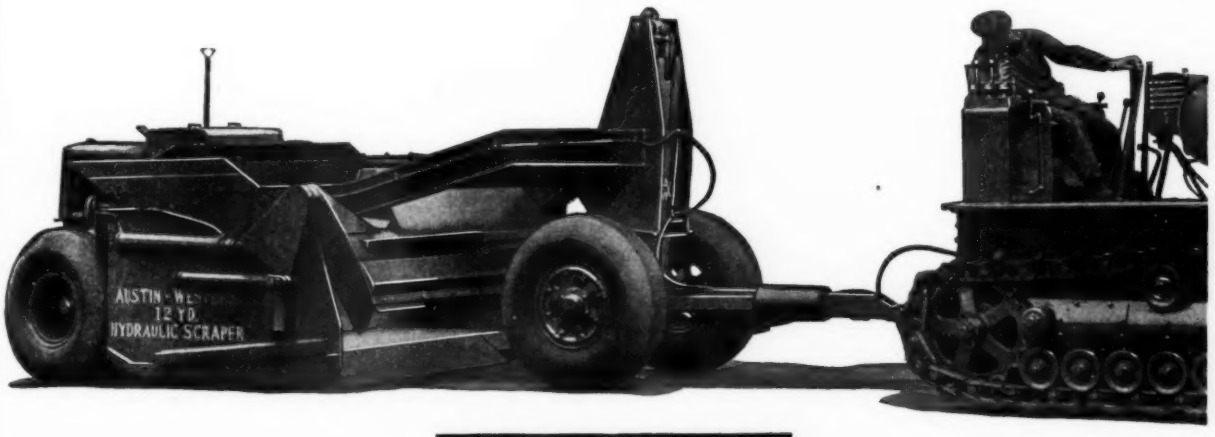


● *On the Quabbin Reservoir near Enfield, Mass., C. J. Maney Company of Boston uses this Bucyrus-Erie 32-B crane to place steel forms and to assist in spotting the concrete discharge spout.*

Needed.. YET NO OTHER SCRAPER HAS BOTH

1 Full hydraulic controls magnetically operated from tractor; connect or disconnect in 20 seconds.

2 Separate motor operates scraper; no straining or stalling of tractor.



12-YARD SCRAPER *by* AUSTIN-WESTERN

● One man operates this 12-yard scraper easily. The powerful hydraulic controls are operated by remote magnetic control from the driver's seat of the tractor. Control connection between tractor and scraper is made as quickly as plugging in an ordinary electric lamp. No hose or cables—in 20 seconds the tractor may be detached and used for other work. This is an exclusive Austin-Western feature.

View of Scraper Loaded in Carrying Position

A separate power plant powers the hydraulic mechanism. With it there is no stalling of tractor or slowing down of operation. This is another important Austin-Western feature. Power door-closing and power unloading.

The A-W 12-yard Scraper is made for fast, continuous work under the most severe conditions. Special alloy steel increases capacity and lightens dead weight. Three-point suspension takes away strain from frame on roughest ground. Open top permits loading with shovel or elevating grader where desired. Extra high clearance for travel over broken ground.

The Austin-Western Road Machinery Co.

Home Office: Aurora, Ill. Cable Address: AWCO, Aurora, Ill.

Branches in 14 Principal Cities

Austin-Western

ROAD GRADERS · MOTOR GRADERS · ELEVATING GRADERS · DRAGS
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CRUSHING AND WASHING PLANTS · SWEEPERS AND SPRINKLERS · SHOVELS · CRANES · ETC · SNOW PLOWS

The Austin-Western Road Machinery Co.
C-9, Aurora, Illinois
Please send me details on the 12-yard Scraper.

Name.....606-C
Address.....
City.....State.....

When writing to Austin-Western Road Machinery Co., please use coupon or card bound in this issue.

Aggregate Associations Conclude Successful Conventions

DURING the week of January 27-30, the three Aggregate Associations, the National Crushed Stone Association, the National Sand & Gravel Association, and the National Slag Association, held their annual conventions concurrently in St. Louis with headquarters at Hotel Jefferson. The conventions were featured by a large and representative attendance by members of the Associations and a joint exposition of machinery and equipment used in the production and handling of aggregates, arranged by the member companies of the Manufacturers Division.

The opening address at the National Crushed Stone Association convention was given by President Russell Rarey. Then followed reports by Regional Vice Presidents on business conditions in 1935 and the outlook for 1936. A. T. Goldbeck, Director, Bureau of Engineering, National Crushed Stone Association, spoke on "A Decade with the Bureau of Engineering;" H. S. Fairbank, Chief Division of Information, U. S. Bureau of Public Roads, spoke on "Planning for Future Highways." Other speakers were: Frank Sheets, Consulting Engineer, Portland Cement Association; J. R. Boyd, Secretary, N. C. S. A.; and T. C. Powers, Assistant to the Director of Research, Portland Cement Association: Officers elected for the coming year are: H. E. Rodes, Franklin Limestone Company, Nashville, President; and Wm. E. Hilliard, New Haven Trap Rock Corporation, New Haven, Secretary-Treasurer.

The Board of Directors of the National Sand & Gravel Association held their annual meeting on Monday, January 27. The sessions held Tuesday was opened with an address by President H. V. Owens and reports by Executive Secretary V. P. Ahearn, and Director, Engineering and Research Division, Stanton Walker. The sessions held on Thursday were devoted to a study of the various projects encountered in the production of sand and gravel. The newly elected officers are: Alex Foster, Jr., Warner Company, Philadelphia, President; J. Rutledge Hill, Gifford-Hill & Co., Inc., Dallas, Vice President; and H. S. Davison, J. K. Davison & Brothers, Pittsburgh, Secretary-Treasurer.

The two associations met with the National Slag Association on Wednesday, January 29, for the consideration

● *Construction scenes at Bonneville Dam, $31,000,000 power and navigation project 40 miles up the Columbia from Portland. Top: Columbia Construction Company's Model 6160 Bucyrus-Monighan dragline excavates down to rock within the south cofferdam. Center: A close-up of one of the many hauling units on this job. The big bucket dumps its load into a 30-yard LeTourneau 16-wheeled buggy pulled by a Caterpillar Diesel 75. Bottom: Heavy-duty excavation in rock is handled by this Bucyrus-Erie electric 75-B.*

BUCYRUS-ERIE

This is one of the new 120-B's used in quarry work by Mason-Walsh-Atkinson-Kier Company at Cuyahoga Falls, Ohio.

BUCYRUS-ERIE

EXCAVATING, DRILLING AND MATERIAL HANDLING EQUIPMENT...SOUTH MILWAUKEE, WISCONSIN, U.S.A.

of mutual problems through the instrumentality of the Mineral Aggregates Institute. Otho M. Graves, Chairman, Board of Directors, presided at the morning and afternoon sessions. Speakers and their subjects on this day were: Col. H. B. Hackett, Assistant Administrator, Federal Emergency Administration of Public Works, "The Function of Federal Public Works in the Stimulation of Industrial Recovery;" Col. Lawrence Westbrook, Assistant Administrator, WPA, "Construction Program of the Works Progress Administration;" Abram F. Myers, former Chairman of the Federal Trade Commission and well known corporation attorney, "The Future of Industrial Cooperation Under Governmental Auspices;" John C. Gall, Associate Counsel of the National Association of Manufacturers, "The Significance of Social Security and Labor Legislation;" and Col. Willard T. Chevalier, Vice-President, McGraw-Hill Publishing Company, "Construction Revival—The Responsibilities of Industry."

A. G. C. Annual Meeting Held in Miami

THE Associated General Contractors of America held their 17th annual convention January 13-15 in Miami, Florida, with a large representation from all parts of the country in attendance. Two days of the meeting were devoted to general convention sessions while the third day was given to meetings of the Association's three major divisions: the highway contractors' division; the heavy construction and railroad contractors' division; and the building contractors' division.

Among the subjects considered at the highway division meeting were: the diversion of motor fees; providing adequate highway financing; accident prevention for highway builders; and registration and licensing of highway contractors. This division presented a recommendation for a four-year highway program and the continuation of regular Federal-Aid highway appropriations without interruptions and in an amount of not less than $125,000,000 annually. This recommendation was adopted by the Association.

One of the interesting subjects discussed at the meeting of the heavy construction and railroad contractors' division was that of the return of private construction for railroads and public utilities.

Officers elected by the Association for the coming year are: President W. A. Klinger, Sioux City, Iowa; and Vice President at large E. P. Palmer, New York City. William Muirhead, Durham, North Carolina, was reappointed secretary-treasurer.

Massachusetts Highway Program for 1936

THE MAJOR PART of Massachusetts' 1936 highway program will depend on legislative action, according to Chief Engineer G. H. Delano. The known funds available consist of $1,741,877 from Federal Aid (Hayden-Cartwright) plus an equal amount of state funds to match; $7,473,718 from the Works Relief Bill; $3,657,995 from state funds available for sidewalk construction; and $2,402,729 from state funds available for land damages and other state expenses in connection with the Federal program.

During 1935 the Department spent $6,871,004 for new construction, $8,195,498 for maintenance, and $3,237,453 for PWA construction, a total of $18,403,955.

Work performed under the construction program included: 101 miles of high-type pavement; 7 miles of gravel surfacing; 20 new structures; and alterations to 4 existing structures.

Money to do this work was derived as follows: $3,356,000 from Federal Aid; $11,810,502 from the state gas tax; and $3,237,453 from PWA allotments.

Work carried over into 1936 consists of 8 miles of high-type pavement, 3.5 miles of crushed stone surfacing, and 9 bridges, to be done with state and Federal funds amounting to $1,560,000; and 3.5 miles of high-type pavement, 1 mile of gravel surfacing, and 3 bridges, to be done with state and local funds amounting to $305,580.

New Jersey Highway Program for 1936

ALTHOUGH it is anticipated that the New Jersey State Highway Department will have an income of approximately $36,000,000 during the coming year, certain fixed expenditures will require almost $23,000,000 of this sum. These fixed charges will include: $8,000,000 for debt service; $6,000,000 for road aid to counties; $5,600,000 for sinking fund, and various other purposes.

Motor vehicle fees are expected to bring in $16,300,000 while the revenue from the gasoline tax is expected to exceed $17,000,000.

New projects in the 1936 highway program call for an expenditure of $8,895,000 provided that $5,400,000 borrowed by the state for relief use is paid back. In the event this money is not received the department program will be $2,944,000.

Some of the projects to be constructed in 1936 are: the Perth Amboy bypass at a cost of $1,170,000; 4.5 miles of paving near Linden for $953,251; 2 miles of paving on the Belleville Turnpike in Hudson County for $250,000; 9 miles on the Laurelton-Lakehurst Road for $435,000.

Chickamauga Dam Construction Authorized by TVA

IMMEDIATE construction of the Chickamauga Dam, located on the Tennessee River seven miles above Chattanooga, has been authorized by the Tennessee Valley Authority. The structure, one of five authorized at the last session of Congress, will have a length of 5,685 feet and a maximum height of 104 feet to impound 421,000 acre-feet of water in a lake extending 60 miles upstream. No power installation is planned at the present time. Estimated cost of the structure is $32,000,000.

Chickamauga is the fifth in the series of dams constructed on the Tennessee River for flood control, navigation, and electric power production. The series, starting at the downstream end, is: Pickwick Landing, Wilson, Wheeler, Guntersville, Chickamauga.

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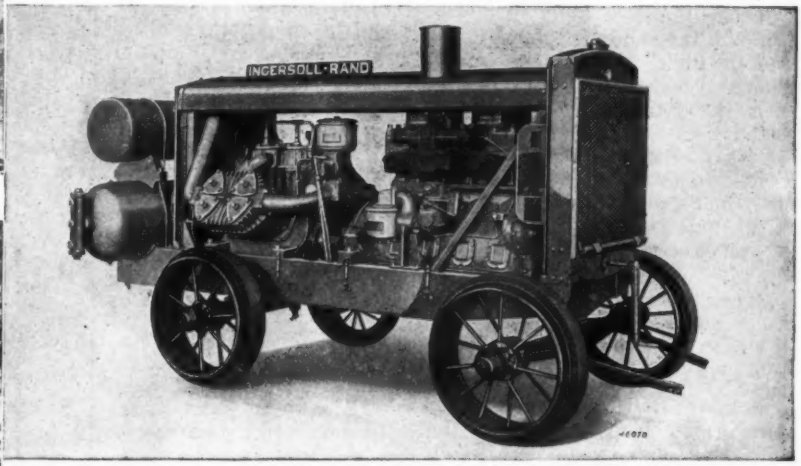

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Three years ago when I-R *pioneered* in the field of Air-Cooled portable compressors, we claimed that these machines would deliver *more air*, use *less fuel* and give more dependable *service*. These machines were then the result of six separate designs that had been built and tested during the previous two years, all based on our 67 years of compressor building experience.

Today experienced contractors *know* what I-R two-stage, air-cooled machines will do. They know, or can quickly ascertain the facts, from actual results in the field on a wide variety of construction jobs, a few of which are pictured here. The *actual opinion* of users is available for check-up—and it's what the user says that *counts*.

The salient features of these compressors are given below. The results of these features, in actual service over a three-year period, have proved I-R Two-Stage Air-Cooled Portable Compressors to be an economical, efficient and dependable source of air power under all conditions of service. Five sizes—all recognized styles of mountings.

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Field Notes

(Continued from Page 95)

The depth of the hole is entirely dependent on the length of time the lance is kept in operation. As the hole gets deeper, the rate of melting slows up somewhat and because the heat is confined the hole may become enlarged.

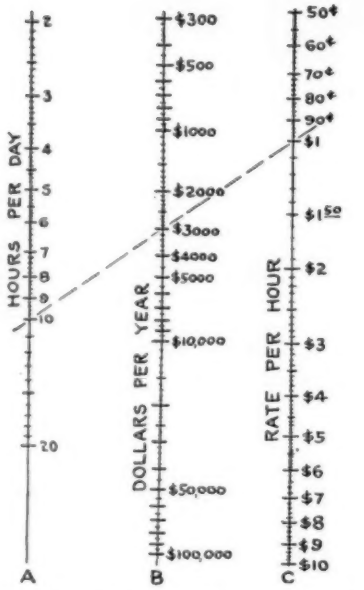
This method of stone drilling is well worth keeping in mind for use when conditions arise which might make a job easier if the oxygen lance were utilized.

—Oxy-Acetylene Tips.

Salary Chart

HOW MUCH do you make per year? Or, how much per hour? If you are paid by the hour, this chart tells how much you make per year. If paid by the year, it gives the rate per hour. These are points of interest to all of us, but we seldom take time to figure them out. This chart was therefore developed to simplify the figuring.

Find the number of hours you work per day in column A. Run a line through that point and the dollars per year, column B, and your rate per hour will be found in column C. Or, if paid by the hour, run the line through the rate per hour, column C, and your



income per year will be found in column B.

For example, the dotted line drawn across the chart shows that if you work 10 hours per day, and if you receive $3,000 per year, your rate is $1 per hour. Or, if paid $1 per hour, your income is $3,000 per year.

The chart is based on 300 working days per year, the figure that is most commonly used in computations of this kind because it takes Sundays and holidays into consideration.

— W. F. Schaphorst, M.E.

Equipment Rental as "Labor"

THERE IS SUCH variation in the phraseology of the statutes of different states, concerning the scope of public contractors' bonds for the payment of claims of third parties, that one furnishing the use of equipment to a contractor or subcontractor, on the faith of the contractor's bond, should make sure—not assume—that the law of the particular state gives a right of action on the bond for equipment rentals.

This warning is inspired on reading the recent decision of the Pennsylvania Supreme Court in the case of City of Lancaster vs. George, 172 Atl. 686.

The Keystone Driller Company rented a ditcher scoop to a sewer contractor. The company and its attorneys felt that the contractor's statutory bond for payment "for material furnished **and labor supplied** or performed in the prosecution of the work," etc., was broad enough to secure payment of the rental charge. But the Supreme Court ruled otherwise, saying, in part:

"Notwithstanding this comprehensive language, the subject of liability is labor and materials. It was held some years ago the word 'material' did not include machinery, tools, or appliances used for the purpose of facilitating the work. * * * This determination of the interpretation of 'material,' though under a different situation, embodied its full meaning as applied to the statute and bond in question.

"Rental is not a labor claim.

* * *

"As a matter of policy, it is necessary to confine the word 'labor' in this connection to its primary meaning, and not to permit it to be so broadened as to carry the liability of a surety under these bonds to indefinite and uncontemplated lengths."

—Arthur L. H. Street, Attorney-at-law.

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Sauerman Slacklines and Drag Scrapers will do just that —reach from 100 to 1500 feet and dig, haul and place the dirt in one operation.

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Old Times and Old Timers

(*Continued from Page 94*)

Pete Greening, an old shovel man and friend of mine, was on the boat with me.

"I was put on a Bucyrus 95 and my first job was to dig out a lot of snake holes which had been left heavily loaded by the French when they gave up the work. First of all I found the shovel pretty low on the track side and working on a slippery bottom. So the first thing I did was to turn the rails. When Crowley, the superintendent, found this out he didn't like it very well and let me know about it.

"One day we had a little extra excitement not on the regular program. I missed a snake hole, and so at noon when I backed up for the men to shoot the one I had uncovered, the blast also set off the one I missed and unfortunately it was right under the dipper. The double blast caused a slide that caught the shovel, bending the frame, and in general doing so much damage that it took five days to put the machine in running order again.

"The shovels were set up at Gorgona and before going out on the work all the base castings were reinforced with clamps. Wm. Bates was shovel superintendent. Each runner had a sheet to fill out each night that took in everything from the teeth to the couplings behind. A repair train and crew went through every night with a 100-ton wrecking crane and box cars filled with supplies. The repair crew could change any part of the shovel over night except the base casting. I remember that when I reported the shipper shaft needed babbit, I would find another boom on in the morning and everything ready for work.

"One day Bill Bates came along with a magnet, and I asked him what he was doing with it. He said he was looking for a manganese cutter that had been on a shovel for a year but they didn't know which one. By applying the magnet to the cutter he could tell whether it was ordinary steel or manganese. As it happened the manganese cutter was on the shovel I was running and in A-1 condition.

"Pete Greening, who arrived on the job with me, had always operated a Marion and the only way he could remember which way to swing, was to keep repeating 'come to me' or 'go from me' meaning the boom.

"I remember that they tried out vanadium steel on the shovels. A whole shipload of vanadium steel pitch-brace bolts, chains, etc., arrived in Panama when this alloy steel first came out. The results were bad for the new pitch-braces broke off square in three parts and the chains snapped like glass so they soon stopped using that supply.

"When I was ready to leave the job after being there six years one could stand on the bank and wonder how the dirt from that big hole ever got through those dippers, but perseverance and plenty of good shovel equipment accomplished what seemed impossible.

"I certainly would like to hear from any Old Timer who worked on the canal. I enjoy all the Old Timers' letters very much."

Your letter is interesting to us and we believe our readers will find it so. We hope other Old Timers on the canal will get in touch with you.

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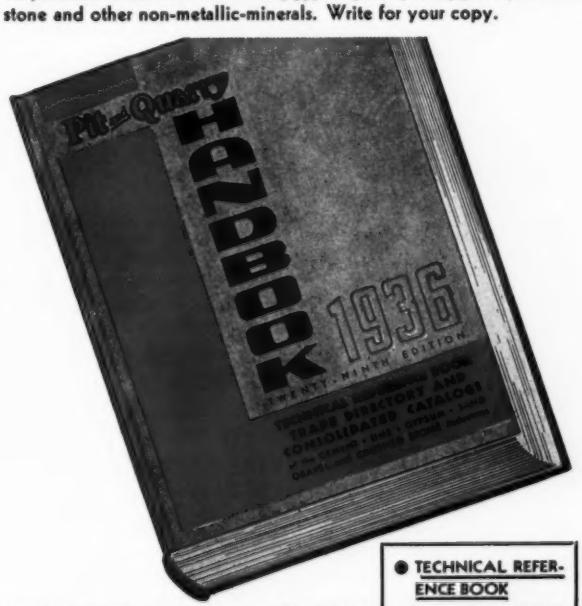

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● *After the shovel has completed the rough grading, a LeTourneau carryall scraper and a Caterpillar blade worked out the small irregularities and brought the road to a smooth, finished grade.*

(*Continued from Page 90*)

The finish grading was done with a Caterpillar highway grader and a LeTourneau 12-yard carryall hauled by another Caterpillar tractor. A very little of the material handled at the upper end of the job was dirt, which was used for finishing on that quarter of the contract.

On a job featured principally by tough rock digging, with the constant necessity of maintaining traffic at all times, it is to the credit of Superintendent John S. (Red) Parker and the organization of Pearson & Dickerson that this 5-mile job was carried through in good time. Summer thunder showers delayed work considerably during July, August and September.

Those carriers and travelers who must use this stretch of road habitually will have frequent occasion to be grateful for the wider, straighter highway which they now have available for their use.

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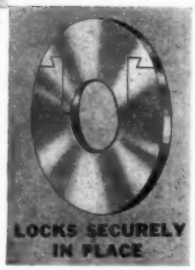
Reduce repair costs and avoid shutdowns and delays by the use of these easily installed BECO Thrust Collars. No need to dismantle the machinery—just slip the collar in and tap the over-latch into place. Designed to keep gears and pinions in mesh, take up end play, and help cut the wear-and-tear expense that comes from loose bearings. Anyone can easily apply BECO Thrust Collars. A complete line of sizes is available. Send a trial order today. 221



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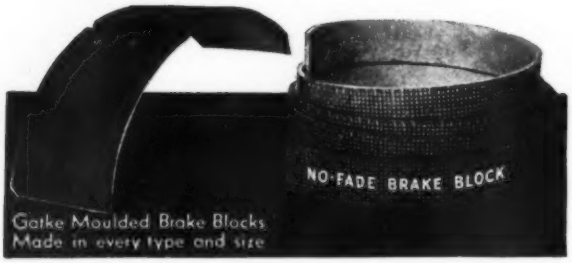

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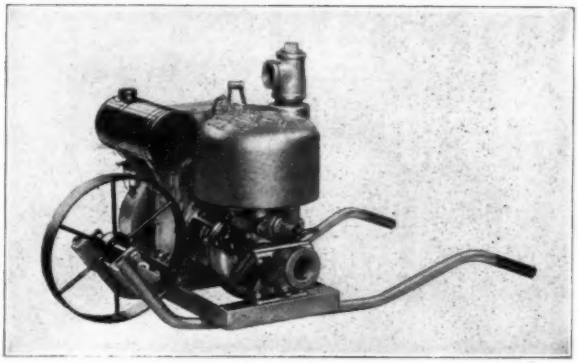

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CHAIN BELT COMPANY
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REX Construction Equipment

Speedy Slide Removal

(Continued from Page 91)

the J. P. Holland organization was given the job of cleaning it up once and for all.

The contract called for the removal of all debris encroaching upon the highway. Furthermore, the entire loose mass in the hill above was to be pushed down until a stable slope was attained. The material removed, roughly 50,000 yards, was to be placed in layers against the side of a fill at one end of the original cut.

To handle the job Paul Holland ferried across the bay from San Francisco the following equipment: One 1¾-yard Bucyrus-Erie 43-B Diesel shovel; one 70-hp Allis-Chalmers tractor with LeTourneau bulldozer; five 7-yard pneumatic-tired Fageol dump trucks; a portable work shop and tool shed.

Preliminary work of cleaning up the slide was done by the A-C tractor which worked all over the upper part of the slide area, bulldozing all loose material down the hill to where the shovel, working at the level of the highway, could reach it. With this accomplished, the tractor was put to work on the fill, leveling out the rock and clay dumped by the trucks.

● *This Allis-Chalmers tractor equipped with a LeTourneau bulldozer first had the job of pushing the loose slide material down to where the shovel could reach it. Then the tractor was placed out on the fill where it leveled off the dumped material.*

Under supervision of "Hank" Willie, who had complete charge of the job for the Holland organization, the work of slide removal was handled on a double shift basis, each shift eight hours. Expertly handled by Bill Lake and Tommy Tout, the Bucyrus-Erie shovel worked at top speed, operating most of the time at the center of the slide area. Following a long established practice of high speed dirt movers, the trucks backing under the shovel came in alternately to its right and left, so that always when one loaded truck pulled away another was waiting for the next dipperful.

Output of the shovel averaged 225 truckloads of 6 cubic yards each per shift, the entire 50,000 yards being removed in less than 19 working days. The only delay during the entire job was a three-day shutdown because of torrential rains. Only four trucks were required for the 1,000-foot haul, the fifth being kept in reserve as a spare.

The Holland organization has been identified with San Francisco's progress for 30 years, first achieving prominence in the construction of the Stockton Street tunnel. For a number of years the company confined its activities to the city of San Francisco. Recently, with Paul Holland as head, the company has handled nearby highway construction jobs, on which its work has been featured by the same traditional speed and good management.

● *Working at the base of the slide, the 1¾-yard Diesel-powered Bucyrus-Erie loads trucks at the rate of 170 yards an hour.*

"See here, Tommy," said the teacher, "you musn't say, 'I ain't going.' You must say, 'I am not going'; 'he is not going'; 'they are not going'; 'we are not going'."

"Gee," replied Tommy, "ain't nobody going?"

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1¼ CU. YD. DIPPER — 25' BOOM — 17' DIPPER HANDLE — Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Machine Guarantee. SE-23.

1 1¾ CU. YD. DIPPER, 30' boom, 19' handle, high lift shovel equipment—Will fit 50-B. New. SE-33.

1 1¾ CU. YD. DIPPER, 22' boom, 16' handle, shovel equipment—Will fit 43-B. New. SE-34.

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⅝ CU. YD. DIPPER—20' Boom together with all necessary ropes and material to completely convert Bucyrus-Erie 1020 Shovel, Clamshell or Dragline to Skimmer Scoop Machine. NEW. Shipment 2 to 3 weeks. SS-1.

Dragline Equipment

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2—20-B—31-B. Used. DL-3.

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BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

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BRAND NEW Ropes included with each of above Trench Digging Equipments.

DIPPER HANDLES

1 7'6" 1030 TUNNEL—Complete. New. H-1.
1 7'10½" 20-B TUNNEL (two sticks). New. H-2.
1 9'0" 31-B TUNNEL (two sticks). New. H-3.
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1 9'6" 20-B TUNNEL (two sticks). New. H-5.
1 9'6" 31-B TUNNEL (two sticks). New. H-6.
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4—18' 20-B STEAM SHOVEL BOOMS—New. JA-2.
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2—20'6" 20-B STEAM SHOVEL BOOM—New. JA-4.
1—21'6" 37-B CHAIN CROWD SHOVEL BOOM—New. JA-26.
1—21'9" 31-B STEAM SHOVEL BOOM—New. JA-5.
1—22'0" 43-B CHAIN CROWD SHOVEL BOOM—Used. JA-27.
3—23' 20-B DIESEL, GAS OR ELECTRIC SHOVEL BOOM—New. JA-7.
1—23'6" 37-B ROPE CROWD SHOVEL BOOM—New. JA-28.
1—24'0" 43-B ROPE CROWD SHOVEL BOOM—New. JA-29
1—24'0" GA-2 DRAG SHOVEL BOOM—New. JA-30.
1—24' GA-2 or GA-3 SHOVEL BOOM—New. JA-8.
2—24' 43-B ROPE CROWD SHOVEL BOOM—New. JA-9.
1—25'9" 30-B DIESEL SHOVEL BOOM—New. JA-10.
1—26' 20-B DIESEL SHOVEL BOOM—New. JA-11.
2—26' D-2 SHOVEL BOOM—New. JA-13.
1—26' 50-B STEAM SHOVEL BOOM—New. JA-15
3—27' 43-B ROPE CROWD SHOVEL BOOM—New. JA-16.
1—27'0" 43-B ROPE CROWD SHOVEL BOOM—New. JA-31.
1—30' 50-B ELECTRIC SHOVEL BOOM—New. JA-17.
3—30' 50-B STEAM SHOVEL BOOM—New. JA-18.
1—40' 20-B, 31-B and D-2 DRAGLINE BOOM—Used. JA-20.

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Small Machines

3 ½ CU. YD.—Plate Front—Will fit 1020 Drag Shovel. New. D-45.

2 ⅝ CU. YD.—Plate Front—Will fit 20-B. New. D-12.

1 2/3 CU. YD.—Plate Front—Will fit 14-B. New. D-13.

2 ¾ CU. YD.—Rock Type—Will fit 20-B. New. D-15.

1 ⅞ CU. YD.—Ins. Tooth—Will fit 1030. New. D-47.

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1 1 CU. YD.—Plate Front—Will fit 20-B. New. D-42.

1 1 CU. YD.—Manganese—Will fit B-2 and GA-2. Good condition. Used. D-40.

1 1 CU. YD.—Rock Type—Will fit 1030 Tunnel Shovel. New. D-50.

2 1¼ CU. YD.—Ins. Tooth—Will fit 30-B, 41-B, 42-B, E-2. New. D-44.

1 1¼ CU. YD.—Cast Front—Will fit 30-B, 41-B, 42-B, E-2. Used. D-43.

1 1¼ CU. YD.—Rock Type—Will fit 30-B, 41-B, 42-B, E-2. Used. D-27.

1 1¼ CU. YD. — Ins. Tooth — Will fit 37-B. New. D-51.

1 1¼ CU. YD. — Ins. Tooth — Will fit 37-B. Used. D-52.

1 1¾ CU. YD. — Ins. Tooth — Will fit 37-B. Used. D-88.

2 1½ CU. YD.—Ins. Tooth—Will fit 42-B, 43-B. New. D-55.

1 1½ CU. YD.—Ins. Tooth—Will fit 43-B. Used. D-89.

3 1¾ CU. YD.—Ins. Tooth—Will fit 43-B. New. D-58.

1 ⅝ CU. YD. ROCK—Will fit 20-B. New. D-64.

1 1 CU. YD. PLATE FRONT—Will fit 30-B, 41-B, 42-B, E-2. New. D-65.

1 1 CU. YD. CAST FRONT—Will fit 30-B. New. D-66.

Large Machines

1 2 CU. YD.—Manganese—Will fit 43-B. New. D-62.

2 3 CU. YD.—2½" Molybdenum cast steel front, two part Van Port reversible teeth—Will fit 100-B, 68-C, 70-C. New. D-2.

1 3½ CU. YD.—2¾" nickel chrome steel front, two part Van Port reversible teeth—Will fit 68-C, 95-C, Class 80 Atlantic. New. D-3.

1 4 CU. YD.—2¾" Molybdenum cast steel front, two part reversible teeth. In good condition.—Will fit 100-C, 120-B. Used. D-4.

1 6 CU. YD.—Molybdenum steel front. Annealed cast steel back, two-part Reversible Van Port Teeth.—Will fit 200-B, 225-B and 320-B. New. D-11.

1 8 CU. YD.—Front Molybdenum steel, two part Van Port Reversible teeth. Slightly used but excellent condition.—Will fit 320-B. Used. D-6.

DIPPER TRIPS

1—30-B STEAM DIPPER TRIP—New. DT-1.

1—31-B STEAM DIPPER TRIP—New. DT-2.

1—50-B STEAM DIPPER TRIP—New. DT-3.

8—50-B STEAM DIPPER TRIPS—New. DT-4.

1—D-2 STEAM DIPPER TRIP—Used. DT-5.

LOCOMOTIVES

3 24-INCH GAUGE 3-TON BALDWIN GASOLINE LOCOMOTIVES. Model AL. Type 2. Price very favorable. L-1.

BUCKETS

Dragline

3 ¾ CU. YD.—BECO TYPE "X". 2200 lbs. New. DB-21.

3 2 CU. YD.—PAGE CLASS "C". 5630 lbs. New. DB-4.

1 2 CU. YD.—BECO TYPE "U". 3650 lbs. Rebuilt. DB-12.

4 2 CU. YD.—BECO TYPE "U". 3650 lbs. New. DB-30.

1 2 CU. YD.—BECO TYPE "X". 5300 lbs. New. DB-23.

2 2 CU. YD.—BECO HEAVY DUTY. 5400 lbs. New. DB-24.

3 2¼ CU. YD.—BECO TYPE "U". 3850 lbs. New. DB-13.

2 2½ CU. YD.—BECO TYPE "U". 4100 lbs. New. DB-14.

1 2½ CU. YD.—BECO HEAVY DUTY. 6500 lbs. Rebuilt. DB-9.

1 2½ CU. YD.—OMAHA—STD. 5400 lbs. Rebuilt. DB-10.

1 5 CU. YD.—BECO HEAVY DUTY. 12700 lbs. New. DB-28.

1 5 CU. YD.—MONIGHAN HEAVY DUTY. 12000 lbs. New. DB-16.

1 6 CU. YD.—MONIGHAN TYPE "W". 12500 lbs. New. DB-17.

1 6 CU. YD.—BECO TYPE "X". 14400 lbs. New. DB-29.

1 7 CU. YD.—MONIGHAN TYPE "W". 13700 lbs. New. DB-18.

Clamshell

1 2 CU. YD. TYPE PF WILLIAMS CLAMSHELL BUCKET without teeth and counterweight. CSB-1.

ELECTRICAL EQUIPMENT

90 H.P. MOTOR — GENERAL ELECTRIC — 3 phase, 25 cycle, 550 volt, 1500 RPM. NEW. EE-1.

5 KVA TRANSFORMER—GENERAL ELECTRIC—2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. NEW. EE-4.

125 KW GENERATOR—WESTINGHOUSE—250 volts, 500 amperes, Direct current. 440 RPM. Includes two outboard bearings. NEW. EE-5.

TANKS

Water

5—260 GALLON 41⅞"x21"x6'4". No. 14 BW gauge steel plate. T-1.

2—200 GALLON 36½"x20⅛"x6'3" high. Elliptical—¼" steel plates. T-2.

1—283 GALLON 54⅜"x17⅜"x6'4". ¼" Steel plates. T-3.

Oil

15—60 GALLON 11½"x18"x77" Elliptical Blue annealed copper alloy smooth plate. T-4.

6—25 GALLON 47¼" dia. 14" deep—12 Gauge Std. Blue annealed copper alloy steel. T-5.

1—294 GALLON 48"x21¼"x6'4". ⅛" steel plates. T-6.

4—50 GALLON 60" dia. x 12" deep—No. 12 Gauge Std. blue annealed copper alloy. T-7.

Gasoline

1—44 GALLON 18" dia. 43" high—No. 14 Gauge U. S. Std. welded construction. T-8.

5—55 GALLON 30"x18½"x23½" 16 Gauge—U.S.S. Terne metal. T-9.

Air

3—5 CU. FT.—16" dia. x 48" high—225 lb. working pressure A.S.M.E. Std. Tested to 340 lb. cold water test. T-10.

5—6 CU. FT.—16" dia. x 4'4" high—200 lb. working pressure A.S.M.E. Std. Tested to 350 lb. cold water test. T-11.

1—14 CU. FT.—21½" dia. x 77" high—200 lb. working pressure. Will pass inspection in Massachusetts and any Canadian Province. T-12.

2 16 CU. FT—22⅝" dia. 77" high—200 lb. working pressure A.S.M.E. Std. T-13.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2—140 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—5 cylinder, 9" bore x 10½" stroke, 514 R.P.M., 4 cycle, vertical overhead valves, dust proof, oil tight crank case and forced lubrication. Includes auxiliary air starting equipment. DE-2.

1—45 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINE—3 cylinder, 6" bore x 8" stroke, 600 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-5.

3—110 H.P. NEW, NON-REVERSIBLE ATLAS DIESEL ENGINES—6 cylinder, 7" bore x 8½" stroke, 600 R.P.M., 4 cycle, vertical, overhead valves and forced lubrication. DE-6.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 H.P. at 400 R.P.M. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 H.P. at 400 R.P.M. 100 lb. Pressure. ME-3.

1 5"x5" reversible—25.6 H.P. at 400 R.P.M. 100 lb. Pressure. ME-4.

BOILERS

NEW

Will Make That Old Shovel Work Like New.

Can also be used for Miscellaneous Service

Vertical Type

2 46½"x110"—32 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3. B-9.

Locomotive Type

3 44'x17'—75 H.P. 125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

1—70"x12'—136 H.P. 175 lb. Working Pressure. ASME and Mass. Std. Will fit 120-B. B-18.

PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge — bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP. Electric Motor. ME-6.

AIR COMPRESSORS

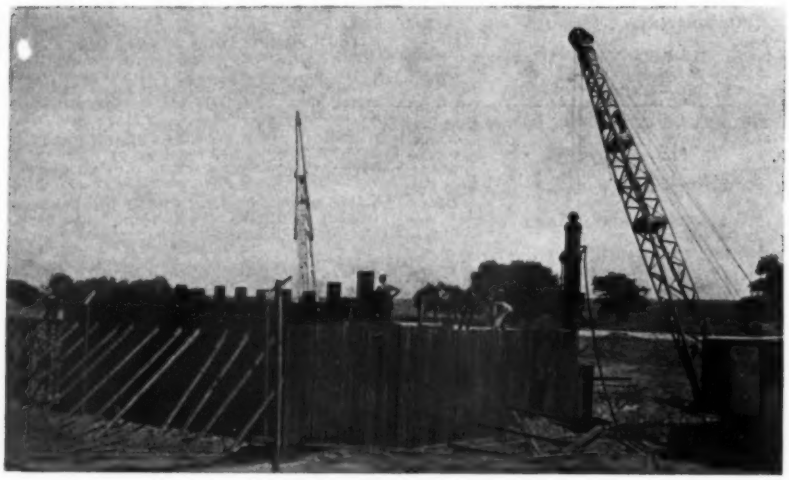
1 BRAND NEW WORTHINGTON—METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves—Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure, A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M.—Overall dimensions: Height 45"—length 37½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. NEW. AC-1.

1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

Protecting Denver from Flash Floods

(*Continued from Page 88*)



ets respectively, were brought over to handle the excavation for the pool. The draglines loaded to dump trucks and completed the work in short order. The normal water flow in Cherry Creek was handled successfully with two 8-inch submerged pumps.

Specifications called for the pool to be lined with concrete, which is now completed. When the dam is put into service, the ordinary flow of water in Cherry Creek will leave the stilling pool and flow into an area 410 feet wide by 470 feet long, and 10 to 12 feet deep, the bottom of which is protected with a heavy layer of rip rap. Concrete for the various structures was mixed in a Chain Belt Rex mixer and pumped to the forms through a 7-inch pipe by a Chain Belt Pumpcrete unit. Aggregate was brought in by trucks and placed in the batching bins by a Lorain 75-A crane.

The overflow spillway is located along the south bank of the valley where the dam fill is not very high. Here an area about 425 feet wide by 700 feet long was excavated to a depth of eight feet on the average. The spillway will discharge down a walled and stepped panel which narrows and deepens as it goes along, being 300 feet wide at the weir and after curving in along both sides in a Y shape it is only 75 feet wide at the lower end. Here the discharged water will strike an inclined concrete wall which curves up and back towards the dam so as to check its momentum after which it discharges laterally over a large field protected with rip rap. With the water in the dam up to crest height the spillway will have a capacity of 17,550 second feet which is considered ample to handle any flood waters about which information is available. The crest of the dam itself will be surmounted by a concrete parapet wall.

● *To prevent any possibility of undercutting by water when the dam is subjected to a flood all structures are outlined by rows of steel sheet piling. The illustration here shows the operation of outlining the intake face wall of the discharge conduit and a part of the conduit floor.*

Upstream Face Protected with Rip Rap

The upstream face of the embankment is protected by an 18-inch layer of hand-placed rip rap. This "man size" rock was shipped in by rail and unloaded from a special spur track which was built to serve this project.

The loose, dumped rip-rap, placed downstream from the dam in the stilling pool and the spillway discharge was brought in by trucks from the foot hills of the mountains some 25 miles away.

Work is being carried on in four five-hour shifts with over 400 men engaged on the project. At night the roadways are lined with oil flares while the area within the dam actively under construction is flood lighted electrically.

In addition to the mechanical equipment described previously, Mr. Carlson has 48 head of horses on the job for fresno work and other useful jobs.

The total cost of the Cherry Creek project will be $840,000 of which PWA provides 30 per cent, the city of Denver 35 per cent and the Cherry Creek Flood Control Improvement District, comprising the property most benefited, will be assessed the remaining 35 per cent.

● *The clay fill is compacted by a roller made of several railroad car wheels assembled on a heavy axle and drawn by a Caterpillar 30. Attached to the roller is a disc which leaves furrows to provide an interlock for the next layer of fill.*

Trade Notes

Koehring Company, Milwaukee, recently announced the appointment of new distributors for the sale of their products: pavers, mixers, mud-jacks, dumptors, shovels, cranes, and draglines as follows: **Howard W. Read Corporation,** 800 North Delaware Avenue, Philadelphia, Pennsylvania, will have the eastern Pennsylvania territory; the **Dalrymple Equipment Company,** Amory, Mississippi, will serve the northern section of Mississippi; and the **Parker, Danner Company,** 4 Northampton Street, Boston, Massachusetts, will serve Vermont, Maine, New Hampshire, and Massachusetts with the exception of a few western counties.

Chain Belt Company, Milwaukee, Wisconsin, recently announced the appointment of **O. S. Stapley Company,** 723 Grand Avenue, Phoenix, Arizona, as exclusive distributors for the line of Rex construction equipment in and about the vicinity of Phoenix, Arizona. In addition, the **Western Material Company,** Sioux Falls, South Dakota, has been made an exclusive distributor for Rex equipment in the state of South Dakota.

Stulz-Sickles Company, 134 Lafayette Street, Newark, New Jersey, has announced that the United States Patent Office recently issued to them their third patent, No. 2,021,945, covering the manufacture of Manganal 11 to 13½ per cent Nickel Manganese Steel in the form of welding electrodes, applicator bars, wedge bars and core bars.

The Patten Tractor & Equipment Company, distributors for Caterpillar products in the Chicago area, recently moved to new and larger quarters at 1056 North Kolmar Avenue on Chicago's northwest side. The new location is more accessible than the old and the larger plant makes it possible to improve sales, service, and parts facilities.

Book Reviews

Diesel Engineering Handbook—A De Luxe edition of the "Diesel Engineering Handbook" is now available for distribution. The publishers state that much favorable comment greeted the issuance of the seventh edition of the Diesel Engineering Handbook in 1934 (the first since 1930). The only criticism was that the book, like all annual editions, could not completely cover the whole subject of Diesel application and operation. The need for an all-inclusive handbook became apparent, and so the publishers prepared the De Luxe edition which covers every phase of the subject. This valuable book, packed with essential data for the man looking for general as well as specific information on Diesel engines, their application, their care and maintenance, contains over 800 pages and is handsomely bound in grained, red, water-proof leatherette decorated in gold. The book is divided into 40 chapters each covering an important subject. Starting with an introduction giving the history of the internal combustion engine, the contents cover basic Diesel principles, fuel injection systems, slow, medium, and high speed Diesels, and fundamental engineering principles, to mention only a few of the forty chapter headings. The price of the book is $5.00 which is very reasonable considering the size and information contained therein. The book may be ordered directly from **Diesel Publications Inc.,** 192 Lexington Avenue, New York City, or *Excavating Engineer* will be glad to forward your order when accompanied by your check, currency, or money order.

INDEX
FOR VOLUME XXIX
January to December, 1935, inclusive
NOW READY
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EXCAVATING ENGINEER
South Milwaukee, Wisconsin

Heavy-Duty Air Compressors—A 36-page bulletin describing the I-R line of power-driven, horizontal duplex, moderate speed, heavy-duty air compressors has just been issued by **Ingersoll-Rand Company,** 11 Broadway, New York City. The capacities covered in this bulletin range from 50 to 250-hp. for single or multi-stage compression. All types are equipped with the new I-R channel valve. A copy of the new bulletin, No. 3162, may be had by writing the manufacturer.

Minerals Yearbook—The publication of the "Minerals Yearbook, 1935" is announced by the **Bureau of Mines, Department of the Interior.** The volume, containing 75 chapters, 129 illustrations, and nearly 1,300 pages, constitutes a condensed library of current de-

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

SUPERINTENDENT OR FOREMAN

Graduate mining engineer having 25 years' experience, greater part of which has been on coal stripping, is looking for position as superintendent or foreman on some kind of dirt moving job. Has been operating metal mines for past two years. Age 48; married. Prefers to stay in Western States but will go anywhere for right opening. Now located in Arizona. Box 7802.

LARGE MACHINE OPERATOR

Operator with 24 years' experience on all types and makes of machines desires position on large shovel or dragline. Prefers large electric stripper but will consider any permanent connection. Has worked on grading, levee building, quarrying, gravel pit, coal stripping and iron mining. Last job on 750-B coal stripper. Age 46; married. Will go anywhere. Can do own repair work. Best of references furnished. Now located in Indiana. Box 7803.

OPERATOR

Experienced operator desires shovel or dragline work. Has had fourteen years' experience on shovel, dragline and clamshell in quarry, coal stripping and loading, and contracting. Prefers Bucyrus or Marion—½ to 6 yards—steam, electric or gas. Can do own repair work. Can furnish best of references. Age 39; married. Willing to go anywhere. Now located in Kansas City, Mo. Box 7702.

DRAGLINE OPERATOR

Dragline operator who has 13 years' experience on levee and ditch work desires position on Bucyrus or Monighan, gas or Diesel power, any size. Operated Diesel machine 7 years; gas-6 years. Willing to go anywhere. Can do own repair work. References furnished. Age 44; married. Now located in Ohio. Box 7903.

SAFETY MAN

Young man, 25 years old, married, desires position in safety work with mine, quarry or contractor. Experienced in creating safety posters, safety education, first aid teaching, etc. Two years college training. Best references as to character and ability. Now located Minnesota. Box 7901.

CRANE-SHOVEL-DRAGLINE OPERATOR

Position operating any model Bucyrus-Erie, Northwest, P&H, or Koehring up to 2 yards capacity is desired by man who has had fifteen years' experience on steam and gasoline machines. Can do all repair work and erecting. Excellent references. Now located in Wisconsin. Will go anywhere in U. S. Box 7801.

OPERATORS WANTED

Experienced shovel-dragline-crane operators wanted. State age, experience and reference. Write Western Asphalt Paving Corporation, Sioux City, Iowa.

EXPERIENCED OPERATOR

Dragline and Shovel operator having 9 years experience desires position operating machine on road building, sewer, canal or drainage excavation. Prefers 3 or 4 yard Diesel dragline, having 5 years experience on Diesel powered machines and 4 years on gas machines. Has operated dragline 5 years, shovel, 2 years, clamshell, 1 year, and crane, 1 year. Age 31; married. Can do own repair work. Best references. Willing to go anywhere. Now located in Illinois. Box 7902.

SHOVEL OPERATOR

Operator with 15 years' experience on quarry shovels, general grading and strip mining desires position anywhere in U. S. Has operated steam and gasoline machines; shovels, clamshells and pile drivers. Prefers steam machine, Bucyrus 20-B to 225-B. Can do own repair work. References furnished. Age 36; married. Now located in Kansas. Box 7804.

OPERATOR

Operator with seven years' experience desires work on any type machine. Has operated draglines 4 years, shovel 2 years and crane-clamshell 1 year. Experienced on steam, electric, gas, Diesel and gas-air machines in sand and gravel pit, stripping, levee building and lock and dam construction. Can furnish excellent references. Willing to go anywhere. Age 28; married. Now located 70 miles southwest Chicago, Illinois. Box 7701.

velopments in the mineral industries. In addition to accurate official data on all commercially important minerals, there is a resume of the principal economic developments in mining, as well as chapters dealing with progress in coal utilization, uses of petroleum fuels, petroleum and natural gas production, mine safety, and mineral developments from the world viewpoint. The mineral production of the United States in 1934 was valued at $3,350,000,000, an increase of 31 per cent from $2,555,100,000 in 1933, it is stated in a review of the mineral industry contained in the Yearbook. Production of virtually all major mineral commodities increased in 1934; outstanding examples were coal, gold, silver, natural gas, cement, and crushed stone. Copies of the Yearbook, in blue cloth binding, may be purchased at a price of $2.00 from the **Superintendent of Documents, Government Printing Office**, Washington, D. C.

FOR SALE

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Small Shovels
Under 2 Yards

⅜-YARD

BYERS-BEARCAT — Combination Shovel—Pull Shovel and Lifting Crane; Half swing. Gasoline power. Excellent condition. Located Detroit, Michigan. Box 690-SS.

2 INSLEY ⅝ YARD GASOLINE SHOVELS. Located eastern New York State. Bargain prices. Box 574-SS.

INSLEY ⅝ YARD GASOLINE COMBINATION SHOVEL AND BACK HOE. Half swing. Steel Cab. Good condition. Located Central Pennsylvania. Box 735-SS.

UNIVERSAL-UNIT ¾-swing combination ⅝ cu. yd. gasoline shovel and 30-foot boom dragline, including ⅝ cu. yd. dragline bucket. Working every day. Good condition. Located Grand Haven, Michigan. Box 769-SS.

UNIVERSAL—MODEL B—GASOLINE SHOVEL. Good operating condition. Located Indiana. Will deliver any point in state. Box 781-SS.

½-YARD

BROWNHOIST MODEL NO. 2 ½ cu. yd. rope crowd gasoline shovel or clamshell. Waukesha four cylinder engine in good operating condition. Bargain price. Located near Peoria, Illinois. Box 689-SS.

GENERAL COMBINATION SHOVEL-CRANE. Shovel Boom and Handle rebuilt. A-1 shape. ⅝ yard Dipper. 35' Crane Boom. 12 New Cat Tread Links. Cat mounting and general condition machine—good. Located Georgia. Price very reasonable. Box 578-SS.

UNIVERSAL—MODEL NO. 35—½ cu. yd. shovel and 28' boom clamshell including ½ cu. yd. Owens clamshell bucket. Powered by Waukesha four cylinder 4½" x 6¼" gasoline engine. Engine completely overhauled this year. Entire machine put in first class shape. Excellent condition. Located North Carolina. Box 696-SS.

⅝-YARD

MEAD MORRISON—⅝ CUBIC YARD GASOLINE SHOVEL. Good operating condition. Located near Boston. Box 706-SS.

P&H MODEL 300 SHOVEL—18' Boom, 15' Dipper Handle, ⅝ cubic yard Dipper, manganese front. Powered with Waukesha B U 4½"x6¼" engine, power clutch control. First class operating condition. Located Massachusetts. Box 663-SS.

¾-YARD

BUCYRUS-ERIE TYPE B STEAM COMBINATION SHOVEL-CLAMSHELL AND STEAM HOE. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

BUCYRUS-ERIE TYPE B HIGH LIFT STEAM SHOVEL. Caterpillar mounted. Good operating condition. Located New Haven, Connecticut. Box 776-SS.

BUCYRUS-ERIE TYPE B CATERPILLAR MOUNTED, HIGH LIFT STEAM SHOVEL. Good operating condition. Located Connecticut. Box 775-SS.

BUCYRUS-ERIE TYPE B STEAM SHOVEL, cat. mounted, equipped with 19'6" boom 16' dipper stick and ¾ yard dipper including 36' clamshell boom in good working order. Located near Hudson, Pennsylvania. Price $1000.00. Box 493-SS.

BUCYRUS-ERIE TYPE B STEAM SHOVEL, Cat mounted, 19'6" boom, 14' dipper handle, ¾ cubic yard dipper. also 36' clamshell boom and front drum and gearing. Located Kansas City, Missouri. Box 622-SS.

1—Type B Bucyrus-Erie Combination High Lift Shovel and 40' Clamshell Machine.
1—Type B Bucyrus-Erie High Lift Shovel.
2—Type B-2 Bucyrus-Erie High Lift Shovels.
All located western Connecticut. Operating condition. Entire lot very low price. Box 573-SS.

BUCYRUS-ERIE 20-B COMBINATION STEAM SHOVEL - CLAMSHELL - DRAGLINE. Good working condition. Caterpillar Mounted. Located near Peoria, Illinois. Box 701-SS.

BUCYRUS-ERIE TYPE B STANDARD ¾ YARD STEAM SHOVEL—Quarry type Dipper—Caterpillar mounted. Good operating condition. Located Georgia. Box 752-SS.

TYPE B BUCYRUS-ERIE HIGH LIFT STEAM SHOVEL. 21'3" Boom, 18'4" Dipper Handle, ¾ cubic yard inserted Tooth Dipper—Power Boom Hoist—Boiler Feed Pump—Caterpillar Mounted. Located Chicago. Box 699-SS.

KOEHRING MODEL 301 COMBINATION SHOVEL & 40' BOOM DRAGLINE, caterpillar mounted Gasoline Power. Good operating condition. Located Indiana. Box 764-SS.

MARION MODEL 21 ELECTRIC—M.G. SET ¾ YARD SHOVEL. Good condition. Located eastern Pennsylvania. Box 725-SS.

OSGOOD MODEL 18 Steam—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

⅞-YARD

MARION MODEL 21—⅞ CUBIC YARD STEAM SHOVEL. Caterpillar Mounted. Good working condition. Located Georgia. Box 758-SS.

1-YARD

BAY CITY MODEL "S". 21' Boom, 16' Dipper Handle, 1¼ cubic yard Dipper Climax Blue Streak four cylinder 6"x7" Gasoline Engine. Electric Starter. Excellent condition. Located Boston. Box 757-SS.

BUCYRUS-ERIE LATE MODEL B-2 STEAM HIGH LIFT SHOVEL. 1 yard dipper—single shaft cat mounting. Good condition. Located near St. Louis. Box 518-SS.

BUCYRUS-ERIE GA-2 GAS-AIR COMBINATION ONE YARD SHOVEL AND 45' BOOM CLAMSHELL AND DRAGLINE not including Buckets Recently reconditioned. Located Indianapolis. Box 766-SS.

BUCYRUS-ERIE—GA-2 GAS-AIR SHOVEL. Extra High Lift. Caterpillar mounted. Good operating condition Waukesha 5¾"x8" four cylinder gasoline Engine. Air Starter. Located Chicago. Box 764-SS.

1 **BUCYRUS-ERIE B-2** Steam ⅞ yard High Lift Shovel—Cat Mounted. Good operating condition. Located near Boston. Make offer. Box 521-SS.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wisconsin

BUCYRUS-ERIE GA-2 Gas-Air High Lift Shovel. 24' Boom, 18'4" Dipper Handle, 1 cubic yard Dipper. Single shaft cat. Waukesha four cylinder gasoline engine. Excellent operating condition. Located North of Chicago. Box 645-SS.

BUCYRUS-ERIE B-2 Steam Combination Shovel and Clamshell Machine. Single shaft cat mounted. ¾ cubic yard Williams Clamshell Bucket included. Excellent mechanical condition. Located Virginia. Box 672-SS.

BUCYRUS-ERIE B-2 HIGH LIFT STEAM SHOVEL. 19'9" Boom, 16' Dipper Handle, ⅞ cubic yard inserted tooth Dipper. Two speed propelling gear. Located Boston. Box 716-SS.

BUYRUS-ERIE B-2 EXTRA HIGH LIFT STEAM SHOVEL. 21'3" Boom, 16' Dipper Handle, ⅞ cubic yard inserted tooth Dipper. Single Shaft Cat. Located Boston. Box 717-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

BUCYRUS-ERIE GA-2 COMBINATION SHOVEL AND DRAGLINE. 22'6" Shovel Boom, 16' Dipper Handle, 1 cubic yard cast front inserted tooth Dipper. 50' Dragline Boom including Fair leads but not Bucket. Air Starter. Good condition. Located Newark. Box 718-SS.

BUCYRUS-ERIE GA-2 HIGH LIFT SHOVEL. 24' Boom—18'4" Dipper Handle, 1 cubic yard Inserted Tooth Dipper. Also includes Forward Drum and Gearing and mechanism for clamshell operation including 45' boom. Also 1 cubic yard Williams clamshell bucket. Waukesha WL Engine. Good operating condition. Located Chicago. Box 702-SS.

BUCYRUS-ERIE B-2 STEAM SHOVEL, Cat Mounted. 19'9" boom, 16' dipper handle, 1 cubic yard dipper. Good running condition. Located, Minnesota. Box 621-SS.

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Very good working condition. Located South Carolina. Box 644-SS.

BUCYRUS-ERIE MODEL B-2 High Lift Steam Shovel. Caterpillar mounted. Good working condition. Located northern New Jersey. Price very reasonable. Box 643-SS.

BUCYRUS-ERIE GA-2—Gas-Air Combination High Lift Shovel and 50' Boom Dragline Equipment, mounted on Single Shaft Cat. Good operating condition. Located at Fort Smith, Ark. Box 537-SS.

B-2 EXTRA HIGH LIFT STEAM SHOVEL. 24' Boom—18'4" Dipper Handle—¾ yard Inserted Tooth Dipper—Boom Hoist—Caterpillar Mounted—Good operating condition. Located Chicago. Box 700-SS.

LORAIN—MODEL 60—One cubic yard Gasoline Shovel. Good condition. Located Chicago. Box 677-SS.

FOR SALE CHEAP

Marion Model 440 Gas Shovel and Dragline, 1 cubic yard capacity. For sale cheap. Located Missouri. Box 634-SS

MARION 1 CUBIC YARD STEAM SHOVEL. Bargain Price. Box 777-SS.

MARION 1 YARD STEAM SHOVEL. Box 575-SS.

NORTHWEST MODEL 105—1 YARD GASOLINE SHOVEL. Fair running order. Located Georgia. Bargain price. Box 579-SS.

P & H MODEL 600—1 yd. Gasoline Shovel—including 40' boom dragline equipment without bucket. Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

P&H MODEL 600—1¼ CUBIC YARD GASOLINE SHOVEL. Will be put in good operating condition. Located eastern Pennsylvania. Box 664-SS.

P&H—MODEL 600—Combination 1 yard shovel and 40' boom dragline including dragline bucket. Waukesha gasoline engine. Machine in fair operating condition. Located Georgia. Box 695-SS.

1¼-YARD

BUCYRUS-ERIE GA-2 Gas-Air Extra High Lift Shovel—24' Boom, 18'4" Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat. Electric Starter. Excellent condition. Located eastern Pennsylvania. 592-SS.

BUCYRUS-ERIE GA-3—1¼ CU. YD. HIGH LIFT SHOVEL, Waukesha 6¾"x8" 6 cyl. gasoline engine. Excellent condition. Favorable price. Located in Montana. Box 780-SS.

BUCYRUS-ERIE GA-2 HIGH LIFT SHOVEL—24' boom, 16' dipper handle, 1¼ cubic yard dipper, on single shaft cat. Electric starter, Waukesha 4-cylinder 6¼"x8" gasoline engine. Reported excellent condition. Located Virginia. Box 623-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' Boom, 15' Dipper Handle, 1¼ cu. yd. Dipper, Power Boom Hoist, Cat mounted. Located New York City. Box 545-SS.

BUCYRUS-ERIE — DIESEL-AIR — COMBINATION SHOVEL AND DRAGLINE. 22'6" Boom—16' Dipper Handle—1¼ cubic yard Inserted Tooth Dipper. 45' Boom Complete Dragline Equipment without bucket. Engine—Atlas Diesel. Located Oklahoma. Good operating condition. Box 703-SS.

BUCYRUS-ERIE GAS-AIR TYPE GA-2 HIGH LIFT SHOVEL — 22'6" boom — 16' dipper handle—1¼ yard cast front inserted tooth dipper—single shaft caterpillar mounting—electric starter. Excellent condition. Field reconditioned. Waukesha 4-cylinder 6¼"x8" engine — New cylinder blocks and piston rings. Located near Scranton, Pennsylvania. Will demonstrate. Box 508-SS.

BUCYRUS ERIE GA-2 Gas-Air High Lift Shovel—24' Boom, 16' Dipper Handle, 1¼ cu. yd. Dipper, Single Shaft Cat, Electric Starter. Waukesha 4-cylinder 6¼"x8" Gasoline Engine. Reported excellent condition. Located West Virginia. Box 593-SS.

BUCYRUS-ERIE GAS+AIR—22' Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, Waukesha 6¼"x8" four cylinder gasoline engine. Single Shaft Cat mounted. First class condition. Located eastern New York. Box 601-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL. 21' Boom, 15' Dipper Handle, 1¼ cubic yard Dipper. First class operating condition. Located New York. Box 719-SS.

LIMA MODEL 101—Combination 1¼ yard shovel and 40' plus 10' extension Dragline—powered with gasoline engine Model JK 6½" x7"—4 cylinder. Shovel equipment practically new. Located Colorado. Box 599-SS.

LINK-BELT MODEL K-42 1¼ YARD GASOLINE SHOVEL. Waukesha Model WL 6¼"x 8" 4-cylinder Engine—new blocks and pistons this year. Good working condition. Located Colorado. Box 738-SS.

LORAIN—75-A—One and one-quarter cubic yard Gasoline Shovel. Good condition. Located Chicago. Box 676-SS.

LORAIN MODEL 75 GASOLINE COMBINATION SHOVEL AND DRAGLINE. 1¼ cubic yard Shovel Dipper and 1¼ cubic yard Dragline Bucket included. New in 1929. Good working condition. Located near Denver, Colorado.

Ray Corson Machinery Company
1646 Wazee Street
Denver, Colorado

P & H—MODEL 650—GASOLINE SHOVEL. 23' Boom, 16' Dipper Handle, 1¼ cubic yard Dipper having reversible teeth. Waukesha Model W.L. Engine four cylinder 6¼"x8". Field reconditioned. Excellent shape. Located western Wisconsin. Now available. Box 783-SS.

THEW LORAIN MODEL 75 SHOVEL. 24' Boom, 15' dipper handle, 1¼ cubic yard dipper. Gasoline. Machine now operating. Located central New York State. Box 665-SS.

MARION TYPE 32 STEAMER. Shop No. 5676, 18' boom, 15' dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

NORTHWEST MODEL 105 SHOVEL. Bargain Price. Located Texas. Box No. 566-SS.

1½-YARD

BUCYRUS-ERIE 35-B ELECTRIC 24' BOOM, 16' Dipper Handle, 1½ cu. yd. Dipper, 3 phase, 25 cycle, 440 volt, Cat mounted. Box 544-SS.

BUCYRUS-ERIE—42-B—STEAM SHOVEL—21' Boom, 15' Dipper Handle, 1½ cubic yard Vanderhoef Dipper, Power Boom Hoist, Dipper Trip. Located Connecticut. Box 786-SS.

BUCYRUS-ERIE 43-B GASOLINE CHAIN CROWD SHOVEL — 23' boom — 17' dipper handle—1½ cubic yard Vanderhoef dipper and teeth—electric starter—standard single shaft cat. Operated less than six months. Excellent appearance and condition. Will be demonstrated by owner. Located vicinity New York. No. 512-SS.

KOEHRING—MODEL 601—GASOLINE SHOVEL—1½ cubic yard Dipper, 24' Boom, 18' Dipper Handle. Wisconsin 6 cylinder Model E 6x7 Gasoline Engine. Winch Head. Located northern Maryland. Box 784-SS.

LORAIN 75 COMBINATION SHOVEL AND DRAGLINE. 1¼ cubic yard Shovel Equipment. 50' Dragline Boom, without bucket. Waukesha 6¾"x8" four cylinder gasoline engine. Excellent condition. Located eastern Pennsylvania. Box 720-SS.

TWO LORAIN 75-B COMBINATION 1¼ CUBIC YARD SHOVEL AND 50' BOOM DRAGLINES — without buckets. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 721-SS.

LORAIN 75-B 1½ CUBIC YARD SHOVEL. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 722-SS.

OSGOOD "VICTOR" 1½ CUBIC YARD SHOVEL AND 50' BOOM CLAMSHELL MACHINE. Gasoline Power. Good operating condition. Located Wisconsin. Box 760-SS.

P&H MODEL 700—1½ cubic yard shovel. Powered with Waukesha 150 h.p. Ricardo head 7½"x8" gasoline engine. Good operating condition. Located New Mexico. Box 652-SS.

P & H MODEL 700—1½ CU. YD. GASOLINE SHOVEL. Engine: Waukesha 4-cyl. 7½"x8". Fair working condition. Located New Mexico. Bargain price. Box 789-SS.

1¾-YARD

BUCYRUS-ERIE 43-B GAS SHOVEL—22' boom, 16' dipper handle, 1¾ yard inserted-tooth dipper. Electric starter, Wisconsin 6 cylinder 6x7" engine. Reconditioned—first class condition. Located New York. Box 617-SS.

BUCYRUS-ERIE—50-B—DIESEL SHOVEL. 38' Boom, Two 19' Dipper Handles. 1¼ Cubic Yard Rock Bucket and 1¾ Cubic Yard Dirt Bucket. 60' Boom Dragline Equipment without bucket included. Shovel only located Montana. Dragline equipment located Minnesota. Box 785-SS.

Small Draglines
Under 2 Yards

⅜-YARD

TWO ⅜-YARD SARGENT SCOUT DRAGLINES. Powered with McCormick-Deering Model 200 4-cylinder 4¼x5 heavy duty gas engines. Cable speed 160 fpm, single line. Two traveling speeds. Capacity as crane from 8000 lbs. at 8 ft. radius to 2800 lbs. at 24 ft. radius. First class mechanical condition. Located Iowa and Minnesota. Box 772-SD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Draglines
Under 2 Yards
Continued

UNIVERSAL-UNIT ¾ swing combination 30-foot boom gasoline dragline and ⅝ cu. yd. shovel. ⅝ cu. yd. dragline bucket. Working every day. Good condition. Located Grand Haven, Michigan. Box 769-SD.

½-YARD

P&H MODEL 206 GASOLINE DRAGLINE—38' Boom. 4 cylinder Waukesha Gasoline Engine. Located eastern Pennsylvania. Fair condition. Bargain Price. Box 774-SD.

¾-YARD

BUCYRUS-ERIE 20-B COMBINATION STEAM DRAGLINE - CLAMSHELL - SHOVEL. Good working condition. Caterpillar Mounted. Located near Peoria, Illinois. Box 701-SD.

KOEHRING MODEL 301 COMBINATION 40' BOOM DRAGLINE & SHOVEL, caterpillar mounted. Gasoline Power. Good operating condition. Located Indiana. Box 764-SD.

1-YARD

BUCYRUS-ERIE GA-2 COMBINATION DRAGLINE AND SHOVEL. 50' Dragline Boom including Fairlead but not Bucket. 22'6" Shovel Boom, 16' Dipper Handle, 1 cubic yard cast front inserted tooth Dipper. Air Starter. Good condition. Located Newark. Box 718-SD.

BUCYRUS-ERIE GAS-AIR GA-2 COMBINATION 45' BOOM CLAMSHELL AND DRAGLINE. Including ¾ yard Owen Clamshell Bucket and 1 cubic yard Class "C" Page Drag Bucket and necessary equipment for operating either. Massachusetts air tanks. Favorable price. Located Connecticut. Box 778-SD.

BUCYRUS-ERIE GA-2 GAS-AIR COMBINATION 45' BOOM DRAGLINE AND CLAMSHELL AND ONE YARD SHOVEL. Buckets not included. Recently reconditioned. Located Indianapolis. Box 766-SD.

LINK-BELT 1 CUBIC YARD CAPACITY 50' BOOM DRAGLINE WITHOUT BUCKET. Gasoline power. Reported good operating condition. Located near Chicago. Box 724-SD.

P&H—MODEL 600—Combination 40' boom dragline and 1 yard shovel including dragline bucket. Waukesha gasoline engine. Machine in fair operating condition. Located Georg... Box 695-SD.

1¼-YARD

BUCYRUS-ERIE — DIESEL-AIR — COMBINATION DRAGLINE AND SHOVEL. 22'6" Boom—16' Dipper Handle—1¼ cubic yard Inserted Tooth Dipper. 45' Boom—Complete Dragline Equipment without bucket. Engine—Atlas Diesel. Located Oklahoma. Good operating condition. Box 703-SD.

1½-YARD

LINK-BELT MODEL K-44 45' BOOM PLUS TWO 10' AND ONE 5' EXTENSIONS—TOTAL 70' DRAGLINE WITHOUT BUCKET. Gasoline power. Includes 800 Watt Kohler Light Plant. Located near Chicago. Good operating condition. Box 723-SD.

2 LORAIN 75-B COMBINATION DRAGLINES AND SHOVELS. 50' dragline booms without buckets. 1½ cubic yard shovel equipment. Gasoline power. Good working condition. Located eastern Pennsylvania. Box 721-SD.

LORAIN 75 COMBINATION DRAGLINE AND SHOVEL. 50' Dragline Boom without Bucket. 1¼ cubic yard Shovel Equipment. Waukesha 6¾x8" four cylinder gasoline engine. Excellent condition. Located eastern Pennsylvania. Box 720-SD.

TWO P&H 700 DRAGLINES. 1½ cu. yd. buckets on 50' booms. Gas and Diesel. Located Lower Rio Grande Valley, Texas. Box 618-SD.

1¾-YARD

BUCYRUS-ERIE — 43-B GASOLINE — COMBINATION DRAGLINE AND CLAMSHELL— 1¾ cubic yard Bucket capacity—no bucket. Good condition. Located Arizona. Box 704-SD.

Small Clamshells and Cranes
Under 2 Yards

⅜-YARD

BAY CITY "PUP" CLAMSHELL MACHINE. Good operating condition. Box 514-SCC.

½-YARD

BYERS BEARCAT CLAMSHELL—Crane—30' boom. Will handle ½ cubic yard bucket. Located near Grand Rapids, Mich. Box 648-SCC.

GENERAL—GASOLINE—35' BOOM CLAMSHELL. Now operating near St. Joseph, Illinois. Box 782-SCC.

ORTON 24' BOOM—½ CUBIC YARD CLAMSHELL MACHINE. ½ cubic yard Owen Clamshell Bucket. Hercules 55 HP. Gasoline Engine. Factory rebuilt 1932. Good operating condition. Located Tennessee. Box 709-SCC.

UNIVERSAL—MODEL NO. 35—28' boom clamshell and ½ cu. yd. shovel including ½ cu. yd. Owens clamshell bucket. Powered by Waukesha four cylinder 4½" x 6¼" gasoline engine. Engine completely overhauled this year. Entire machine put in first class shape. Excellent condition. Located North Carolina. Box 696-SCC.

¾-YARD

BUCYRUS-ERIE 20-B COMBINATION STEAM CLAMSHELL - DRAGLINE - SHOVEL. Good working condition. Caterpillar Mounted. Located near Peoria, Illinois. Box 701-SCC.

O & S MODEL "T" ¾ yard clamshell machine. 40' boom. Good working condition. Powered with Climax 5½"x7" gasoline engine. Located near St. Louis. Good working condition. Box 651-SCC.

1-YARD

BUCYRUS-ERIE GA-2 45' BOOM CLAMSHELL MACHINE. Single Shaft Cat. Waukesha 5¾"x8" four cylinder gasoline engine. Good operating condition. Located St. Paul, Minnesota. Box 761-SCC.

BUCYRUS-ERIE GA-2 GAS-AIR COMBINATION 45' BOOM CLAMSHELL AND DRAGLINE AND ONE YARD SHOVEL. Buckets not included. Recently reconditioned. Located Indianapolis. Box 766-SCC.

BUCYRUS-ERIE GAS-AIR GA-2 COMBINATION 45' BOOM CLAMSHELL AND DRAGLINE. Including ¾ yard Owen Clamshell Bucket and 1 cubic yard Class "C" Page Drag Bucket and necessary equipment for operating either. Massachusetts air tanks. Favorable price. Located Connecticut. Box 778-SCC.

1¼-YARD

P&H MODEL 700—50' BOOM CLAMSHELL MACHINE INCLUDING 1¼ CUBIC YARD OWEN CLAMSHELL BUCKET. Waukesha 6¼"x8" four cylinder gasoline Engine. Excellent condition. Located Chicago. Box 762-SCC.

NORTHWEST MODEL 105 Gasoline—40' boom clamshell. Good operating condition. Located Iowa. Box 516-SCC.

1½-YARD

OSGOOD "VICTOR" 50' BOOM CLAMSHELL MACHINE AND 1½ CUBIC YARD SHOVEL. Gasoline Power. Good operating condition. Located Wisconsin. Box 760-SCC.

1¾-YARD

BUCYRUS-ERIE — 43B GASOLINE — COMBINATION CLAMSHELL AND DRAGLINE— 1¾ cubic yard Bucket capacity—no bucket. Good condition. Located Arizona. Box 704-SCC.

Large Shovels and Draglines
2 Yards and Over

1½-W MONIGHAN WALKER. Diesel power. 2 yard capacity. 60-foot boom Good condition Reasonably priced. Located Kansas. Box 742-LSD.

2-W MONIGHAN WALKER 3½ yard capacity. 70-foot boom. Good condition. Reasonably priced. Located Kansas. Box 743-LSD.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price $3,000. Box 112-LSD.

PAGE DRAGLINE, track mounted, 90-foot boom, 3½-yard Page RC bucket with new 150 h.p. Venn-Severin Diesel engine. Thoroughly overhauled and rebuilt in 1935. Now working in Indiana. Box 768-LSD.

CLASS 320 STEAM DRAGLINE. 144-foot boom. 8-yard bucket. Located on Illinois River. A good buy. Box 750-LSD.

CLASS 230 STEAM DRAGLINE. 175-foot steel and aluminum boom. 6-yard RED ARCH bucket. Ready to work. Located near New Roads, Louisiana. Box 751-LSD.

If You Do Not Find What You Want Listed—Write Us

Excavating Engineer
South Milwaukee, Wis.

TYPE 175-B ELECTRIC, No. 794 equipped with 87' shovel boom, 48' dipper handle, 3½-yd. bucket, and dragline equipment including 125' boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present, location, Connecticut. Box 263-LSD.

100-B STEAM SHOVEL, 3 yd. dipper, location Eastern Canada. Immediately available. Used—good condition.
Box 669-LSD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

3-W MONIGHAN DIESEL DRAGLINE. 85-foot boom. Electric Swing. 2 buckets—2½ and 3½ cu. yd. capacities. Located Evansville, Indiana. Might be loaded on barge. Box 787-LSD.

MONIGHAN DRAGLINE MODEL T, 2-cubic-yard 60-foot boom located near Wichita, Kansas. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

MONIGHAN STEAM DRAGLINE, two cubic yards capacity. 60' boom. Horizontal locomotive-type boiler. 2½-yard Page bucket. In good operating condition; overhauled in 1931 and not used. Located Iowa. Box 770-LSD.

CLASS 14 STEAM DRAGLINE, 60' boom. 2 cubic yard Page bucket. Locomotive-type boiler. Thoroughly overhauled and ready for service. Located Iowa. Box 771-LSD.

TWO 3-W MONIGHAN WALKERS. 3½ yards. 70- and 77-foot booms. Good condition. Reasonably priced. Located Louisiana. Box 745-LSD.

BUCYRUS 320-B STEAM STRIPPING SHOVEL, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

2-W MONIGHAN WALKER. 2½ yard capacity. 70-foot boom. Good condition. Priced reasonably. Located Louisiana. Box 744-LSD.

FOR SALE OR RENT
TWO CLASS 14 STEAM DRAGLINES, caterpillar mounted, equipped for burning gas or oil. Located, Southwest. Price approximately $4,000 each. Box 619-LSD.

50-B STEAM DRAGLINE. 1½-yard bucket. 60-foot boom. Located in Alabama. Box 747-LSD.

CLASS 14 DIESEL-ELECTRIC DRAGLINE. 70-foot boom. 2-yard bucket. Immediately available. Located near St. Louis. Box 749-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper and sticks. Chicago territory. Box 347-LSD.

75-B BUCYRUS-ERIE ELECTRIC QUARRY SHOVEL. 2½ cu. yd. capacity. Also dragline equipment. Located on west coast. Just the machine for medium size quarry. Box 746-LSD.

68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL, equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable, reel and approximately 1400 feet of cable all in excellent condition. Reasonable price. Address Box 268-LSD.

MARION MODEL 350 W. L. SHOVEL. New 1923. 90' boom, 56' handle, 6 yd. dipper. 3 phase, 60 cycle, 2300 volts, series motors. Has handled about 1,000,000 yds. stripping. Good condition. Location Iron Range. Box 656-LSD.

Locomotive Cranes

TWO AMERICAN STEAM LOCOMOTIVE CRANES. Each 8 wheel—25 ton capacity. Each equipped with 8¼"x10" double cylinder engine. Boom 50'. Steam brakes and train air line. Boiler 54"x101" ASME—130 pounds pressure. Standard gauge 4'x8½". Used only eight months. Splendid condition. Box 628-ME.

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Locomotives

LOCOMOTIVES
3 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine. Box 152-ME.

For Sale or Rent
Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-ton 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

Miscellaneous Equipment

The Bargain of the Year

ONE COMPLETE NARROW GAUGE DIRT MOVING OUTFIT including camps, shop and haulage equipment. Located near Fort Wayne, Indiana. Can you use it?

50 Shovels and picks, approximate.
1 Fairbanks Morse gasoline engine and 5x5 bulldozer pump 3 HP.
2 Fairbanks Morse gasoline engine and 3x5 bulldozer pump 1½ HP.
4 Track jacks, 15 ton.
3 Track jacks, light.
1 Duplex Pump—Worthington, 5¼x3½x5.
10 Slips.
1 Anvil.
1 Forge.
6 Switches.
4 Frogs.
10 Switch points.
1 Carbide light.
20 Western dump cars, 5-yard.
2 Galvanized water tanks, wagon size.
Will consider individual sale of separate items.

Address Box 449 ME.

SHOVEL FRONT ENDS
ONE COMPLETE 52-B DIESEL SHOVEL FRONT END. Consists of boom, dipper handle and 2¼ cu. yd. dipper.
TWO COMPLETE 52-B ELECTRIC SHOVEL FRONT ENDS. Consist of Booms, dipper handles and 2¼ cu. yd. dippers. Motors on booms are 3-phase, 60 cycle, 2300 volt current. Box 741-ME.

4—75 DIESEL CATERPILLAR TRACTORS.
4—EUCLID DUMP WAGONS. Located eastern Pennsylvania. Box 710-ME.

ONE (1) PARSONS No. 40 TRENCHING MACHINE, 18' ladder with buckets for from 18 to 42" trench. In good mechanical condition. Located in St. Louis, Missouri. Price $5000.00 F.O.B. cars. Box 740-ME.

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One (1) set of pile driving leaders, 30' long, iron bound, in excellent condition, suitable for use with 2000 lb. drop hammer, located in St. Louis, Missouri. Price—$35.00. Box 788-ME.

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Complete Welding Outfits, $44.82.

Combination Welding and Cutting Outfit, $59.81.

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The Superior Oxy-Acetylene Company
Hamilton, Ohio

Type B Erie Shovel Front End
21'6" boom, 16' dipper handle and ¾-yard plate front dipper for Type B Erie steam shovel. Good condition. Priced right. Located St. Louis. Box 767-ME.

LOADMASTER—MODEL MD—Wheel type, 16' boom, starter, lights, and Ross steering gear. In service loading freight cars for 17 months. New August 1, 1933. Completely rebuilt with new engine parts, new tires, hoist clutches, etc. Guaranteed like new. Reasonably priced f. o. b. Chicago. Box 684-ME.

CRUSHER

One Buchanan Crusher, Type C, complete. Size 30"x42". A-1 condition. Extra jaws. Also one set 36"x16" sand rolls and one set 14"x25" sand rolls. All located Denver.

Gordon Construction Company
1900-31st St., Denver, Colo.

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17'1½" boom, 11' dipper handle, and two ¾ cubic yard dippers; one 38" wide over cutters—the other 49½" wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 683-ME.

COMPLETE EQUIPMENT for 2 strip mines, contractors or quarry operations, No. 300 and No. 36 Marion steam shovels, well drills, locomotives, cars, crushers, picking tables, loading booms, cable and button retarders, compressors, motors, transformers, flood and search lights, camp equipment and new repair parts for above. Box 195-ME.

DIPPERS—2½ CU. YD.
2—2½ cubic yard dippers for 70C Bucyrus steam shovel. One of these dippers is in good condition and the other has not been used since being rebuilt. Has set new Westico teeth. For particulars write Foley Brothers, Inc., New York Building, St. Paul, Minn.

4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $100.00 each. Chicago territory. Box 349-ME.

PARTS—175-B Shovel—PARTS
1 Main Engine
1 Boom
1 Dipper Shaft
1 Crowding Engine
1 Five Yard Dipper
If interested in making a good buy on these shovel parts, write us. Box 607-ME.

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BUCYRUS-ERIE COMPANY

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ARIZONA, PHOENIX: Arizona Tractor & Equipment Co., 19 West Jefferson St.
ARKANSAS, OSCEOLA: Ben F. Butler Company.
CALIFORNIA, LOS ANGELES: Crook Company, 2900 Santa Fe Avenue, Phone Kimball 5137.
SAN FRANCISCO: Bucyrus-Erie Company, 989 Folsom Street, Phone Garfield 8192.
COLORADO, DENVER: Ray Corson Machinery Co., 1646 Wazee Street.
CONNECTICUT, NEW HAVEN: The W. I. Clark Co., 1811 Dixwell Avenue.
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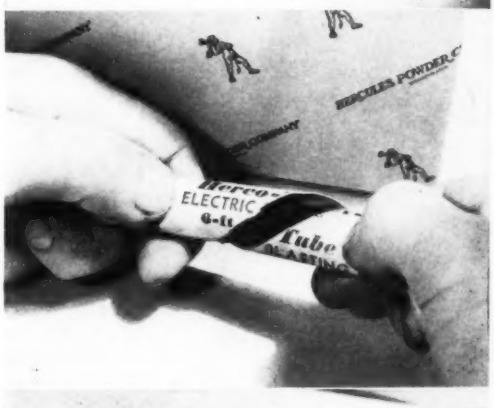

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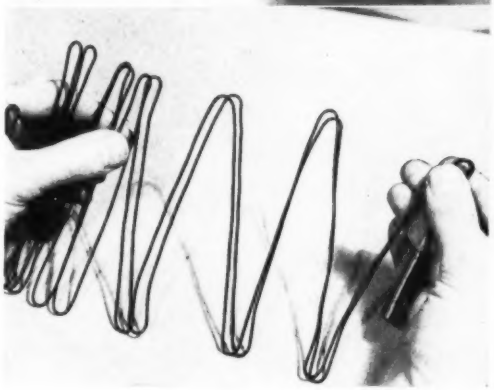

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